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The closing session of the Master Car Builders' convention on last Friday and the ideas apropos of a consolidation of the Master Car Builders' and the Master Mechanics' Associations found in the presidential address of Mr. McIntosh on Monday show quite clearly that the American Railway Association is not like the mills of the gods, in that while its grinding is exceeding small the speed is not slow. It is only a few weeks since the American Railway Association took up seriously the question of affiliating voluntary associations of railroad officials; yet last week the prediction that these conventions had witnessed the passing of the master car builder was received with a seriousness that indicated the belief that it was true. While we all recognize that there must be continuing progress, and that to meet conditions as they exist today consolidation is probably desirable, it cannot but be regretted that these forward steps are of necessity accompanied by radical changes which rudely shatter some tender sentiments of long standing.

The forceful and eloquent speech delivered by George A. Post at the meeting of the Railway Supply Manufacturers' Association on June 20 was a trumpet blast calling the manufacturers of railroad supplies to enter the battle for the defense of railroad properties as a means essential to the protection of their own properties. In making that speech Mr. Post did a service for every man who is connected with a railroad or a railroad supply concern, either as employer or as employe. It seems truly astonishing, when one stops to think about it, that the propaganda of anti-railroad agitation and legislation could have been carried on for months and years at Washington, and at almost every state capital, without manufacturers and their employes seeing the menace to their own interests and taking steps to safeguard them. The money for the purchase of railroad supplies has to come out of the same treasury as interest for railroad bondholders and dividends for railroad stockholders. The less money that goes into that treasury the less that can be paid out of it to manufacturers. The less the manufacturers get out of it the less they can pay to their employes. Perhaps these facts have passed so long unremarked because they are so obvious. Enormously reduced orders for supplies, smokeless chimneys and thousands of men walking the streets hunting for work have forcibly directed attention to them. The situation in which manufacturers find themselves should not lead them merely to denounce those responsible, even though their denunciations should be couched in as brilliant and stinging terms as Mr. Post's. It should prompt immediate and vigorous action. When railroad supply manufacturers and their employes in every part of the country unite with the railroads and their employes in giving notice to the pseudo-reformers and demagogues that they will oppose with their voices and their ballots all who continue, for political purposes, to wage reckless war upon one of the nation's greatest industries such warfare will speedily end.

The committee on "Washing Out Locomotive Boilers" recommends the use of hot water for washing and refilling and indicates that the improved devices secure plenty of water at a temperature of 212 degrees for refilling. The report also emphasizes the importance of maintaining uniform temperature while washing and filling, but it is doubtful whether the water used in washing out, even with improved devices, averages anything near 212 degrees F. In fact, it is certain that a much lower temperature is used, for it is a very uncomfortable task for men to handle a hose and go through the various manipulations necessary for washing out, with water at the boiling point. If the wash water is only 125 or 150 degrees F. and the boiler is cooled down to this temperature, it follows that in order to maintain the uniform temperature which is regarded as so desirable, the refilling should not be done with water as hot as 212 degrees but at the lower temperature of the boiler. It is this failure to maintain uniform temperature in the whole operation of washing and filling boilers which may cause an expensive plant to produce results not fully up to its possibilities or to the expectations of the company which installed it. If the equipment is capable of furnishing plenty of water at 212 degrees for refilling and it is the practice to use this high temperature, then means should be provided for washing out with water at the same temperature, and if this is not possible then the temperature of the water for filling should be reduced. This is a point which the committee could have elaborated further.

Twenty years ago the American Railway Master Mechanics' Association attained its majority and held its twenty-first annual convention at Alexandria Bay with a membership of 322. The total membership as given in the report for 1907 is 876. At the meeting in 1888, J. H. Setchel was president and Angus Sinclair was secretary. The report which created most discussion was one on extension smoke boxes and fire brick arches. Among the names of those prominent in the discussion were: John Hickey, Jacob Johann, J. M. Boone, J. N. Lauder, George W. Stevens and O. Stewart. As a result of the discussion relating to brick arches, a resolution was adopted as the judgment of the convention "that a brick arch applied to the fire box of a locomotive is a desirable addition and a positive advantage." The question of the consolidation of the Master Mechanics' and the Master Car Builders' conventions and holding both the same week, was discussed at this meeting, the principal argument in favor of the plan being that economy of time would be effected, but, as was the case in former years, the proposed change did

not carry. At the close of the meeting a vote of thanks was given to the publishers and proprietors of the "Northwestern Railroader," which for the second year had published a daily edition to report the convention proceedings. The member presenting the motion said that the owners of this paper had shown a great deal of enterprise and energy in giving each morning the published proceedings of the convention of the previous day. That journal and its successors continued the policy of publishing daily editions at the place of the meetings in order to report promptly the proceedings of the mechanical conventions and this year the daily editions of the Railroad Age Gazette mark the twenty-second year of the undertaking.

RAILROADS, THE PUBLIC AND RAILROAD EMPLOYES.

The annual address of President William McIntosh, of the Master Mechanics' association, illustrates the extent to which the minds of railroad officers are occupied by two matters—the relations of the railroad with the public, and its relations with its employes. Mr. McIntosh is a mechanical officer of eminence. He could have discussed purely technical subjects in a manner that would have commanded the attention of technical men the country over. Instead, he devoted, and wisely, almost his entire remarks to the subjects mentioned. For the solution of the problems raised by the very unsatisfactory relations that have existed within recent years between the railroad and the public, and the railroad and its employes, must precede any considerable further development along technical lines on American railroads. Attacks by public authorities have reduced the earnings of the railroads, and so impaired their credit as to make it hard for them to raise money by the sale of securities. The inefficiency of labor, coupled with an unprecedented wage scale, caused operating expenses to encroach seriously upon net earnings even before the panic and the resultant decline of traffic. The railroads cannot prosper in such circumstances. When they do not prosper the mechanical officer lacks money to carry out his plans for needed repairs and improvements and shop employes are thrown out of work.

Many things are essential to harmonize the relations of the railroad with the public. There must be a persevering and extensive campaign to educate the public regarding the country's transportation needs. The people must be brought to a sense of the dependence of the prosperity of all other industries upon the prosperity of the railroads; to a realization of the fact that it does no good to grow or make anything that cannot be got from the place of growth or manufacture to market. The organized strength of railroads and their employes and of railroad supply manufacturers and their employes must be arrayed against the shortsighted selfishness of shippers and the ambition of demagogues who seek to increase their profits and to secure their political advancement by attacking the carriers. A united stand against railroad baiting by those who inevitably become its victims would speedily end it in the nation and in every state.

No less vital to the efficiency and prosperity of the carriers is it that there should be a radical change in their relations with their employes. Employes must be made to see that in the long run the average day's wage must be in proportion to the average day's work. The amount that any road can pay out in wages is not unlimited, and if each employe does not do good work there must be more employes hired to do the work at a lower wage for each man. Bankruptcy is the inevitable destiny of any concern or industry that pays high wages for poor work; and bankrupt industries are not noted for hiring much labor or paying high wages. Mr. McIntosh advocated the more general introduction in shops of the piece work system as a means of increasing the efficiency of labor. One of the great advantages of the piece work system is that it stimulates workmen to make better use of tools and thereby renders it possible to augment the output of shops without proportionately increasing the investment in plants. In order to overcome the repugnance of labor unions to the piece work system it will be necessary for railroad officers to exercise great tact, patience and fairness. If these qualities are shown, its more general introduction will prove of equal benefit to employers and employes. It may easily be introduced in such a way as to increase the average wages of employes while reducing the operating expenses of the roads.

It is easy, but it is not fair, to lay all the blame for the plight the railroads have found themselves in since last November upon the demagogue and the labor union. Railroad officers, including the master car builder and the master mechanic, have been at fault. They have not made enough efforts to enlighten the public regarding transportation problems. They have not done enough to win and keep the loyalty of employes. They have done many things that they ought not to have done and have left undone many things that they ought to have done. A candid admission of these facts must precede all successful efforts to better the relations of the railroads with either the public, on the one hand, or their employes, on the other.

MECHANICAL STOKERS.

Opinion seems still to be divided in regard to the necessity for mechanical stokers, but while there was an apparent apathy in regard to the matter at the time of the convention last year, considerable experimental work has been done during the past year and several new devices have become prominent. The subject is considered of sufficient importance by a number of the larger roads to warrant them in spending some money in experimenting with and developing a mechanical stoker. The arguments in favor of the stoker have been stated frequently, but the economy of fuel has not been generally claimed one of its advantages although the uniform distribution over the grate and the prevention of cold air from entering the fire door, both of which are accomplished by all of the stokers, should certainly result in some fuel economy. The closed fire door should also be of advantage in preventing the leakage of tubes and result in a saving due to the reduced expense for tube repairs, although any such incidental saving must be more than offset by the increased expense necessary for the repairs and maintenance of the stoker itself.

We regard as one of the principal advantages of mechanical stoking the fact that the machine does not gradually tire out or become exhausted as the fireman does, especially in warm weather. As his strength fails the amount of coal delivered to the furnace is reduced and with it steam pressure is either reduced or the supply of steam is so diminished that it is not possible to maintain schedule speed, and in this way the full rating of trains at schedule speed cannot always be maintained by hand firing. In other words, a successful mechanical stoker should enable a locomotive to maintain its maximum capacity from one end of the division to the other, and a higher schedule speed and fuller rating of trains should be obtained by the use of a successful stoker.

The experience with the Day-Kincaid stoker showed that a considerable amount of intelligence and attention was required by the fireman to operate it successfully, and the effect of this on the quality of the supply of firemen should be noticed. On large engines the work of firing by hand is so hard that intelligent men do not seek that grade of employment, and the result is that the supply of material for firemen who are to be future engineers is declining in quality, whereas, the machine firing which requires less labor but more intelligence should attract a better class of men to firemen's positions, and the supply for good engineers would then be better. Another advantage which should be obtained from a mechanical stoker is that it prevents smoke, and this

has been found to be true with the work of several of the stokers which have been in practical use. They also permit of the use of low grade and cheaper coals without the production of excessive smoke and should be regarded as economical devices in this respect.

The various types of stokers which are now being used on locomotives experimentally in this country may be divided into two classes: First are those which do not imitate hand firing, and this class includes those in which the fuel is underfed and used in connection with a blower. The Barnum stoker which is being tested by the Burlington road belongs to this type. Efforts have also been made to use pulverized fuel and blow it into the fire box somewhat in the same manner that oil fuel is used; this kind of firing belongs also to the first type.

The second type of stokers includes those which in some manner imitate hand firing, and these may be again subdivided into: (a) Those which throw the coal by means of a plunger and this type is represented by the Strouse stoker, which is being tested on the Iowa Central, and by the Day-Kincaid stoker which has been used experimentally on a number of railroads. (b) The kind of stoker which blows the coal in by steam jets and distributes it by regulating the blast on different jets; this is represented by the Hayden stoker which has been used on the Erie Railroad during the past year. (c) A device in which a revolving fan forces the coal in through a spout which can be directed to different parts of the grate. This type of stoker is represented by the Crosby which is being developed on the Chicago & Northwestern, and several of them have been in service for a sufficient period to demonstrate their success.

THE MANUFACTURER AND RAILROAD REGULATION.*

I am so proud of this association and of the superb exhibition that its members have installed for the inspection and study of the railway officials here assembled, that I want to speak a word of felicitation and give expression to some thoughts suggested by the conditions surrounding us.

I congratulate you upon the magnificent courage evidenced by this wonderful display of railway equipment. At a time when railways are unable to buy what we produce, except in such meagre quantities that profits are impossible, and our factories are largely closed down, it shows that we have not lost our nerve. The pinch of adversity has not chased smiles from our faces, nor driven good cheer from our hearts. In the face of shrunken earnings, with clouds of doubt enveloping us, and in spite of the hostile attitude of legislative bodies and federal and state officials toward railways, upon whose prosperity depends our hope of success, we have come to Atlantic City undaunted and confident. Never before have we appeared before the mechanical officials of the railways with our products so attractively and sumptuously displayed as now.

Against temporary disaster we put up a bold front, for we know that behind the clouds the sun is still shining. We cannot believe, we shall not believe, that by the sober second thought of the American people the great transportation interests of our country are to be permanently palsied by reckless agitation and devasting attacks. We do not believe that railway officials constitute a criminal class. We do believe that railways have been and are a great blessing, and that railway officials as a class are patriotic, able, and honest. These be no words of cajolery uttered in the hope of favor, but are convictions born of years of observation and personal association.

At this time we do adjure all who are clothed with authority now, or who aspire to wield political power, to reason soberly, to speak temperately, and to act wisely regarding railroad affairs.

We manufacturers cannot forget, even though we are enjoying the delights of this seaside resort, and combining business pursuits with social pleasures, that back home in the workshops that we represent there is silence that tells of tens of thousands of unemployed artisans, who have no respite from the carking worries that infest their days of enforced idleness. From dawn till dark they wait with heavy hearts the long delayed summons to daily remunerative toil, and at night they toss restlessly upon their beds, wondering what of the morrow. For their sakes we hope; for their consolation we utter prophecies of the return of prosperous days. But while they wait we would bid them think, and think hard, whether they have been guiltless in bringing about this condition by following after false prophets who have led them into embarrassing their employers.

When will good times come again? How will they be brought back?

They will come again, and I believe at no far distant day, because Americans prefer work to idleness, joyous utterance to frenzied malediction, and because they admire men who do things that build up in preference to those who smash things with their jaws. They prefer to see the actual parade of the dinner-pail brigade on its way to and from work, to waiting jobless the appearance of an imaginary procession of alleged criminals on their way to jails that seem to be located only in the mirage of swampy brains.

Yes, good times will soon come again, for Americans after they have thought things over, have an inherent love of fair play. They don't want to compel any one to sell them something for two cents that costs more. They are willing when not under the spell of hysterical hallucination that good profit should be made by those who engage in ventures requiring invested capital, skill, patience, and courage. When clothed in their right minds they do not want to cripple great enterprises by meddlesome exactions or unjust requirements.

This aggregation of manufacturers, alert salesmen and fertile-brained designers, is not a band of cringing peddlers who "crook the pregnant hinges of the knee that thrift may follow fawning," and who bellow because their masters have been injured. We do not merely echo a cry of distress. We are part and parcel of the railways. We are as necessary to them as they to us. They recognize that fact. At these conventions the two elements—the railway representatives, and the manufacturers' representatives—intermingle upon terms of equality and mutuality of interest. That which hurts us, hurts them, and vice versa. The railways and we who study and minister to their needs, constitute a tremendous financial and industrial factor which cannot be injured without dire disaster befalling several millions of our countrymen.

It is estimated that of the working male population of the United States, one man out of every twelve maintains himself and his dependents from earnings derived from railways and industries cognate thereto. And yet, this giant force is subjected to contumelious treatment at the hands and mouths of many whipper-snappers who pose as the champions of the people. To denounce railways and corporate interests, is the devilish delight of many cheap demagogues who never carried through a successful financial transaction involving $5,000, or demonstrated capacity to be even a corporal in the industrial army.

How shall good times be brought back to our now sadly injured interest? I answer: By loyalty to our cause. I mean that loyalty which will eradicate all just cause for complaint as to our methods; that loyalty which will lead all those engaged in transportation and cognate industries—every last man, from the executive to the laborer—to join hands for the protection of our common welfare.

How can the railway or our factory employees hope that wages may be maintained, or their services be in demand, if they shall "listen with credulity to the whisperings of fancy," poured into their ears, and are lured into aiding and abetting

*Remarks by George A. Post, president of the Standard Coupler Company of New York, before the Railway Supply Manufacturers' Association at Atlantic City, June 20, 1908.

the schemes of those whose activities can only result in drastic reductions of the revenues of their employers?

There are today idle freight cars enough on the side tracks of our railroads to make a solid train that would reach almost from the Atlantic to the Pacific ocean. What does this mean? Simply a lack of confidence on the part of those who will not loan or invest their money in enterprises requiring borrowed capital because of the chaotic condition of the public mind regarding corporations. And this lack of confidence is largely attributable to the failure of the interests subjected to attack to defend themselves, yes, worse than that, their actual participation in the attack upon themselves—a veritable act of suicide.

Every time an employe in a car, locomotive or tool works, or in a rolling mill, or any other industry depending upon railways for orders, applauds the vociferous denunciation of railways, or votes for a man who poses as an anti-corporation man, by that act he paves the way for a diminished demand for the very thing he is paid to build. After a while he is out of a job, because there are no orders to be filled, and sometimes the deluded soul wonders why. He had been disloyal to himself and his family, and to the interest that furnishes him employment.

This is a time for serious thinking and plain speaking. There should be heart-to-heart talks between those at whom are aimed the envenomed shafts of the corporation-baiters. Our motto should be "Loyalty to Ourselves." We should press this truth home to all our associates and employes that those who plan and invest money that they may have employment, cannot pay them wages unless they help protect them against unwise and unjust legislation. "United we stand, divided we fall."

If from the throats of the hundreds of thousands of railway employes and railway supply manufacturers' employes there should be shouted to the agitators the words, "Shut-up!"—"Hands off!" we would have good times again pretty quick. The strident-voiced blatherskite would flee before the wrath of such a militant body. Confront him with set teeth and grim determination and he will quake and vanish.

When we whose welfare is indissolubly linked with railways, and the railway people themselves, stand up for our mutual rights, confidence will be restored. That confidence will cause the golden stream to flow into channels of new construction and hard times will vanish as dew before the morning sun. Let's quit being everybody's football and play the game ourselves, and show that we are good kickers ourselves. Then there will be less yawp and more work for idle hands to do. I am not talking politics. I recognize that this association is made up of men of differing views upon political questions, but when any set of politicians, by whatever name they call themselves, cause our industries to be paralyzed, that's business, and we should so act as to demonstrate that we mean business. Think of it, gentlemen; this meeting represents more than a thousand corporations and manufacturing concerns in our land, with an investment of scores of millions, giving employment, when busy, to a mighty army of wage-earners. Today, our men are mostly idle. Somebody has blundered, or worse. Somebody knowing nothing of the delicate adjustments of business, has undertaken to run our business and has made a sorry mess of it. Sometimes in some places men of this kind belong to one party, and sometimes in other places they belong to another party. But they could not have been placed in positions where they could have wrought this havoc if our own people had not been fooled by their sophistries. It is time for us to "get wise." It is time to ignore the political label and scrutinize the man.

The railway supply manufacturers of this country are not seeking for governmental pap. We ask for no subsidies; we are not pampered pets of any tariff schedule. We must market our goods under conditions of fiercest competition. All that we ask for is fair play for railways of which we are a constituent part.

Let us go out from here filled with the determination that with all the power that we possess, with all the ardor that our present sufferings suggest, we will, from this time on, stand in solid column against anybody and everybody who would strike down and cripple our railways by demagogic legislation, by executive tyranny, or by inflammatory propaganda. God helps those who help themselves. We can help ourselves. Will we do it?

VANADIUM STEEL EXHIBIT.

The exhibit of the Vanadium Sales Company of America, Pittsburgh, Pa., in the Marine Hall, is an exhaustive exhibit, comprising demonstrative articles from more than 35 of the largest makers of steel, iron, brass and bronze products in the country. The Vanadium ore is mined and smelted by the Vanadium company for use by the steel companies. J. Kent Smith, in the course of a discussion at a recent engineering meeting, said regarding vanadium: "If you can impregnate steel with vitality, if you do not merely make it initially stronger, but give it more endurance, then you have accomplished the main thing necessary." The effect on steels of their impregnation with vanadium is shown at the exhibit by the tests being made by W. L. Turner, with the Turner-Landgraf machine. Vanadium acts in at least three distinct ways; cleansing, toughening, and hardening and strengthening. Vanadium may be applied to all steels, from the mildest case-hardening steel to the toughest and hardest self-hardening tool steels. It is also applicable not only to steels, but to cast iron, brass, and bronze as well.

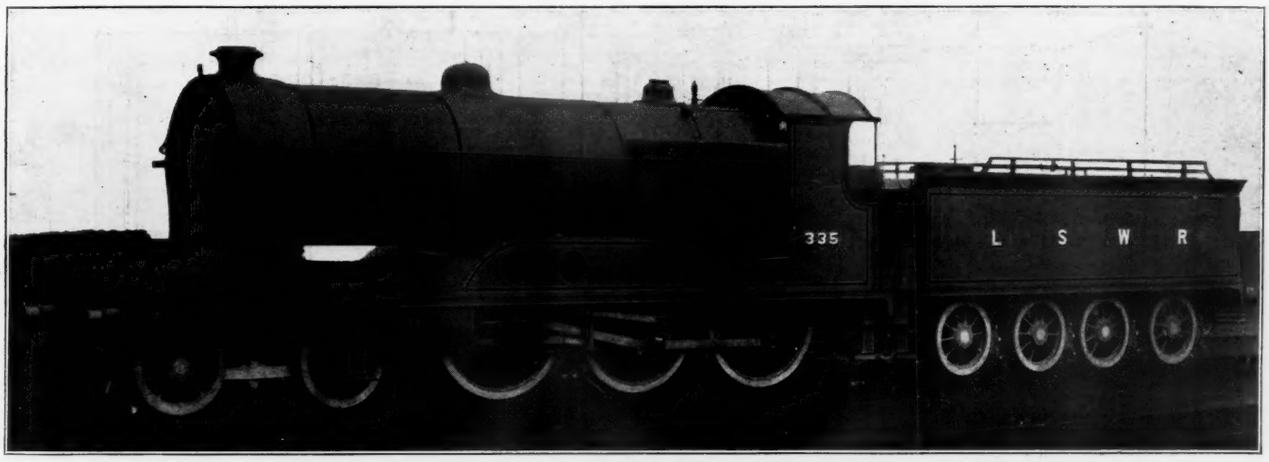
The company's exhibit in space 530 covers the various lines of utility mentioned, containing specimens of the raw ore, its concentrate as an intermediate product in the manufacture of alloy, and the resultant ferro-vanadium or ferro-silico-vanadium, which are the forms used by the steel manufacturer. The exhibit has been arranged by the Vanadium Sales Company and contains contributions from the following companies: Bethlehem Steel; Carnegie Steel; Crucible Steel of America; Jessop Steel; Holcomb Steel; Carpenter Steel; United Steel (Canton, O.); Western Malleable Steel; Standard Steel; Union Steel Castings; Penn Steel Castings; New Process Steel; Billings & Spencer; E. R. Thomas Motor; Ford Motor; Railway Steel Spring; Pittsburgh Steel and Spring; William and Harvey Rowland (Inc.); Hess-Pontiac Spring and Axle; Cleveland-Canton Spring; E. C. Atkins; Geo. H. Bishop; Hunter Saw and Machinery; Lawrenceville Bronze; James Ohlen & Sons; Detroit Steel Products; Anderson Foundry and Machine; Billings & Spencer; New York Ship Building; Mesta Machine; Transue, Williams Company and others.

The American Vanadium Company itself shows some specimens of ore, alloy and a great variety of different pieces which have been subjected to tensile, compression, fatigue, bursting and distorsion tests. The exhibits themselves comprise all kinds of steel castings, from locomotive frames to small engine parts; large and small forgings, treated and untreated; drop forgings, springs, rolled wheels, saws, high speed tools, trolley wheels, bronze and steel bells, etc. A new torpedo tube, invented by Lieut. Commander Clellan Davies (steel made by Carnegie Steel Company), commands particular attention.

Mr. Flannery is himself representing the American Vanadium Company. The company's chief metallurgist, J. Kent Smith, is a practical steel maker of scientific training and twenty years experience, which included extended micrographic investigations, and he personally co-operates with the various users of vanadium in the preparation, treatment and application of the metal.

LONDON & SOUTHWESTERN 10-WHEEL 4-CYLINDER EXPRESS LOCOMOTIVE.

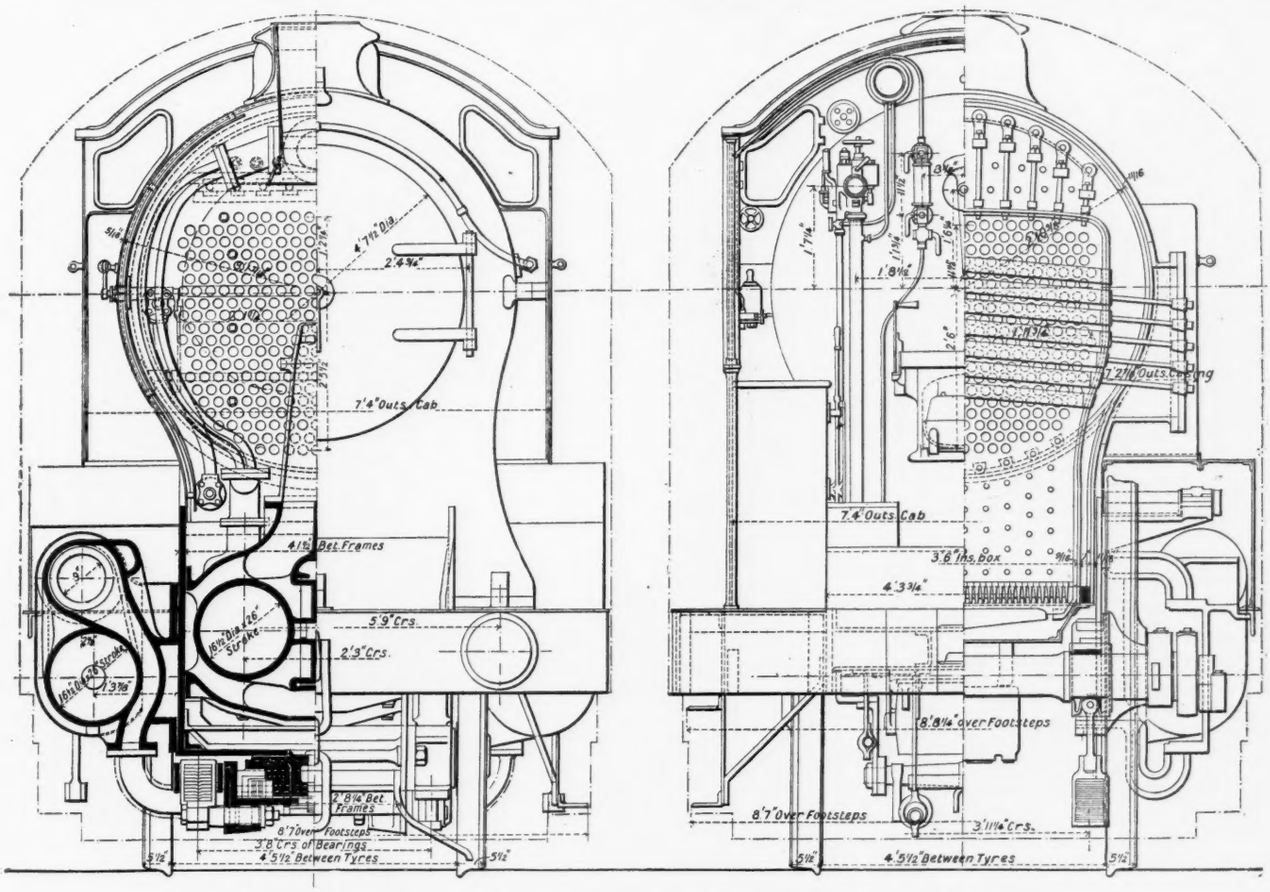
The latest type of passenger engine on the London & Southwestern Railway of England is a 4-cylinder simple engine, recently constructed at the Nine Elms works under the direction of D. Drummond, chief mechanical engineer. The locomotive is a 10-wheel type and is one of the heaviest ever built in Great Britain. The first engine of this type for this line is No. 335 and is shown in the accompanying illustration. It is arranged with Mr. Drummond's design for water tubes in the firebox and is also fitted with his system of feed water heating by exhaust steam. The cylinders are 16½ inches in diameter by 26 inches stroke, and the driving wheels are 72 inches in diameter. The outside cylinders are fitted with piston valves. The heating surface is as follows:



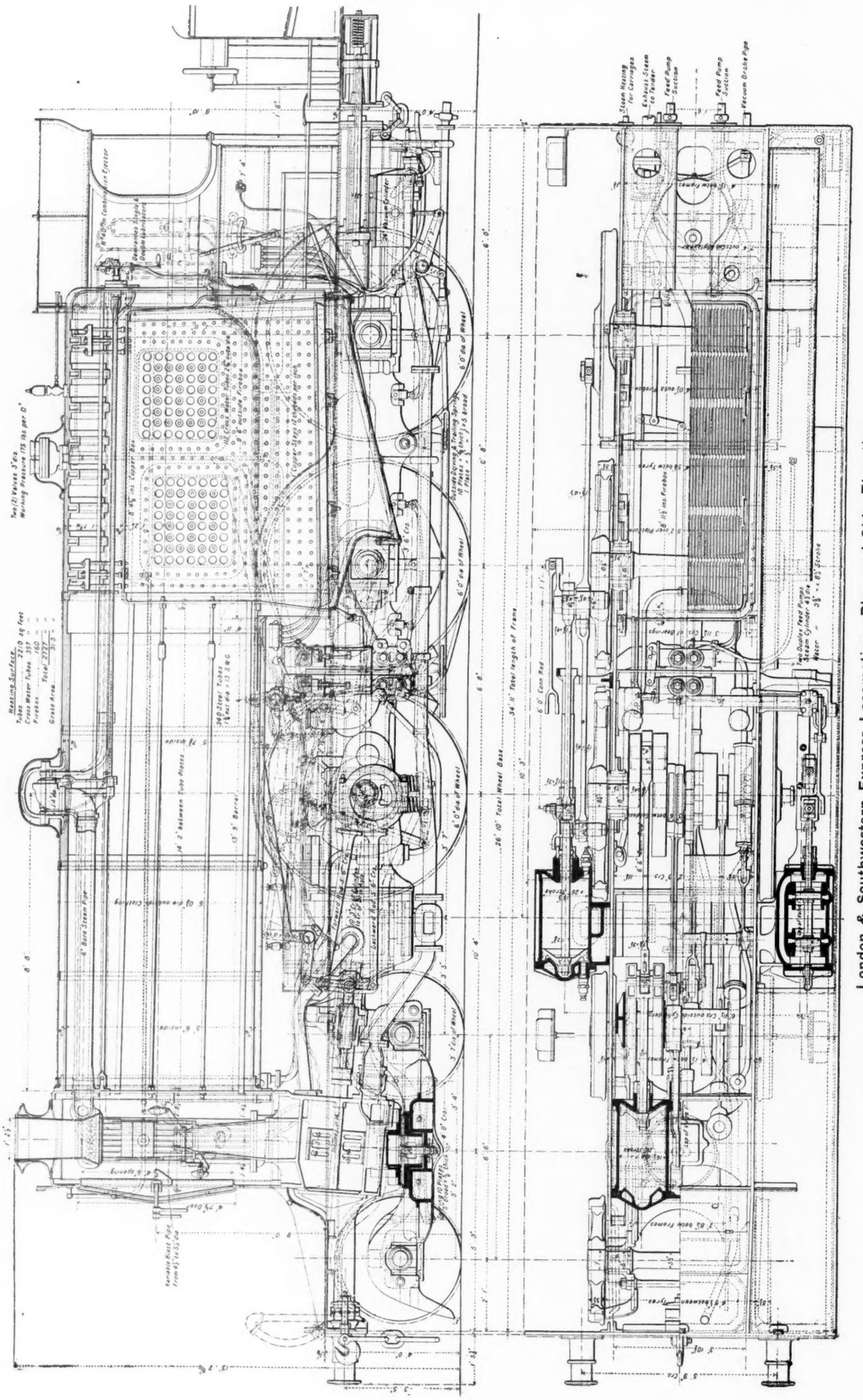
London & Southwestern 10-Wheel 4-Cylinder Express Locomotive.

The regular boiler tubes, 2,210 square feet; the water tubes across firebox, 357 square feet; firebox heating surface proper, 160 square feet; making a total of 2,727 square feet. The working pressure of the boiler is 175 pounds per square inch and the grate area 31.5 square feet.

The heating surface of tubes in the tender well for feed water heating by exhaust steam is 382 square feet. This well

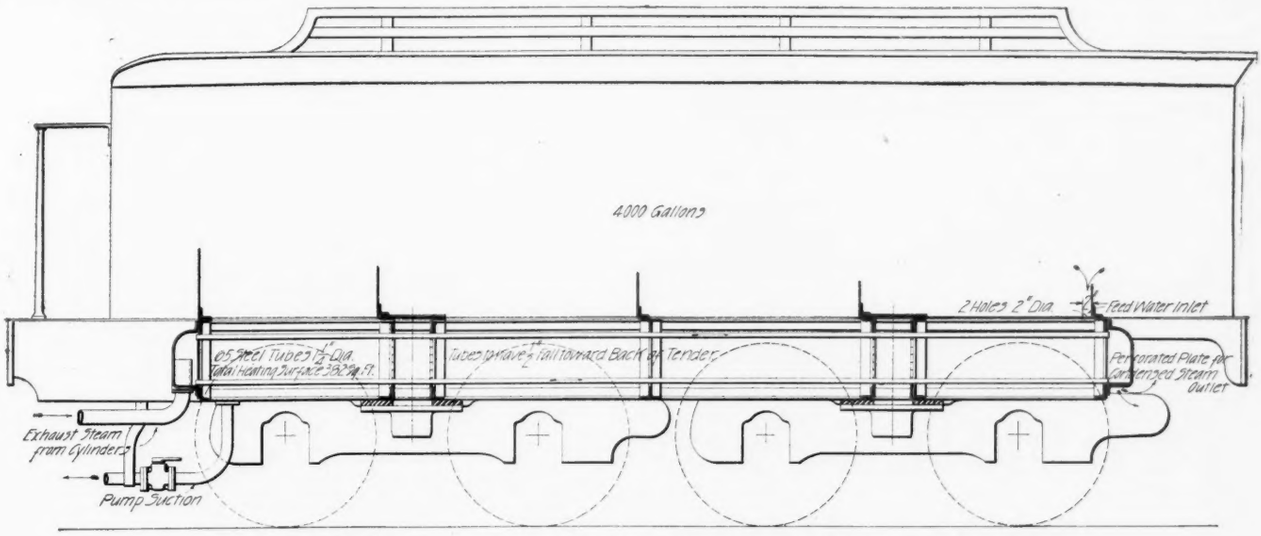


London & Southwestern Express Locomotive—Cross Sections and End Elevation.



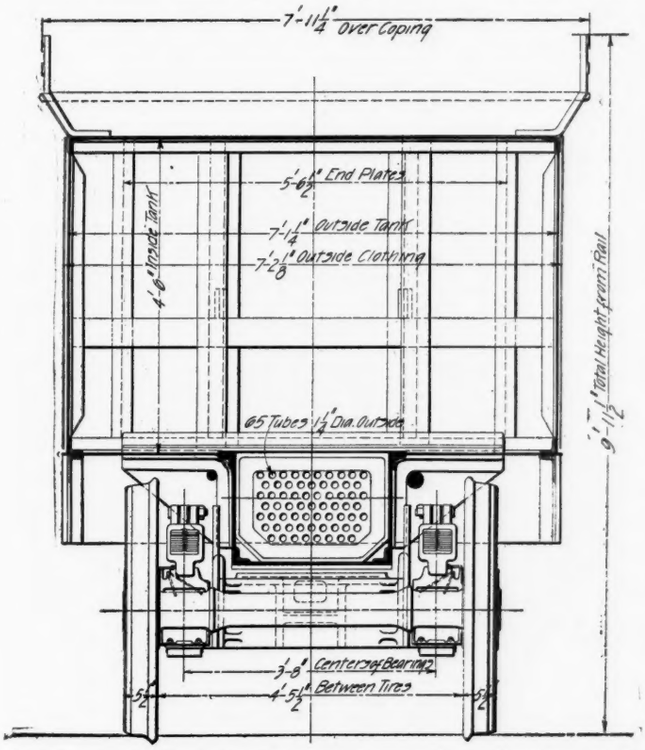
London & Southwestern Express Locomotive—Plan and Side Elevation.

contains 65 tubes 1¼ inches in outside diameter and 18 feet long. The exhaust steam is conveyed from the inside cylinders and passes under the axles to the rear of the engine, taking on its way branches from the two outside cylinders.



London & Southwestern Express Locomotive—Well for Feed Water Heater in Tender.

The connection of this pipe to the outside cylinders will be noticed in the cross section view of the engine. The feed water is rapidly heated to 200 degrees F. and the economy effected by this system is 13 per cent. Another feature of the feed water system is the use of two duplex vertical feed pumps located under the boiler near the front of the firebox.



London & Southwestern Express Locomotive—Well for Feed Water Heater in Tender.

These pumps have steam cylinders 4 inches in diameter, water cylinders 3½ inches in diameter by 8½ inches stroke. We are indebted to The Engineer, London, for the drawings of the locomotive, and to Mr. Drummond for the photograph of the locomotive and the drawings of the feed-water heater.

THE SELF-PROPELLED MOTOR CAR.

Steam railroads have long suffered under the necessity of operating passenger service on branch lines where traffic is so light that a frequent service is not justified, and in many cases these branches are operated at an actual loss in order to maintain the franchise or to make connections. In other cases branches of steam roads, which originally had a good local traffic, have lost much of it to parallel electric railways offering a more frequent and desirable service.

The advent of the self-propelled motor car, which can be operated at a fraction of the cost of an engine and two cars (the usual train on these branches) and which has ample capacity to care for the ordinary traffic, bids fair to bring back to the steam roads much of the traffic lost to the electric and make paying many lines which have heretofore been operated at a loss. By offering frequent service free from smoke and cinders traffic may be actually built up where little existed before, as has been proved many times electrics and make paying many lines which have heretofore used to advantage on new lines where the expected traffic is not sufficient to warrant electrification in the usual manner with the attendant expense of power stations, transmission lines, etc. In many cases after a few years' use of self-propelled motor cars sufficient traffic will be built up to warrant a change to electric operation.

A very promising car of this type has been brought out by the General Electric Company. This car is of the so-called gas-electric type, in which a gasolene engine driven generator accessibly located in the car supplies current to a pair of standard 600-volt railway motors on the trucks. Speed is controlled by varying the voltage of the main generator and by series-parallel relation of the motors. This method allows a great flexibility of control and high efficiency over a wide range of speed. These cars are equipped with an engine of such capacity that it will be working continually at nearly its full output and consequently at maximum efficiency. The car may be stopped, started and reversed with the same facility as an ordinary trolley car. By a slight addition to the control equipment it is possible for these cars to be used interchangeably as self-propelled units or as ordinary trolley cars, obtaining their power from the overhead trolley or third rail. Thus, cars may be operated from the gasolene engine over an interurban section and thence to the center of the city by power from the trolley with the same facility as ordinary trolley cars.

Inspection cars on steam roads and construction cars offer other promising fields for equipments of this kind.

Conventionalities

The free ice water plant at the booth of the Buckeye Steel Castings Company has proved a drawing card.

Have you seen the moving key of the Yale & Towne Mfg. Company? No wonder that it is impossible for such a lock to be picked.

L. B. Eaton, of the Burnett Company, who is one of the old-timers, sends word that illness prevents his attendance at the conventions this year.

H. R. Thomas of the Commonwealth Steel Company says that it is a mistake about the aluminum models in his booth being souvenir watch charms.

Found—A small watch fob, gold, chain pattern. Can be obtained by owner upon application to Charles Wilson at the booth of William Sellers & Co.

Dr. Griffin has taken time out from explaining his wheel truing brake shoe and has been out with his wonderful camera. He is teaching it to see around corners.

Mrs. Sullivan and daughter, Miss Marie, are attending the convention for the first time with S. F. Sullivan, special sales agent of the Ewald Iron Company, St. Louis.

A souvenir ring which is being presented by the National Tube Company at booths 400 and 402 is attracting much favorable attention. The ladies' ring is particularly attractive.

A very little man is spending his vacation at the convention and taking daily continual exercise in lifting a heavy weight in the booth of the Yale & Towne Manufacturing Company.

Christopher Murphy, of Chris Murphy & Co., Chicago, representative of the American Nut & Bolt Fastener Company and the Carter Iron Company, both of Pittsburg, is attending the convention.

We all know what a shampoo is, but what is a car seat shampoo? The Duntley vacuum cleaner explains and the process is being demonstrated at the Chicago Pneumatic Tool Company's exhibit.

G. S. Allen, a railroad man for 52 years, and for 36 years master mechanic of the Reading at Tamaqua, Pa., is visiting the convention with his son C. W. Allen, vice-president of the L. J. Bordo Company.

Eldon Macleod, of the Mason Regulator Company, came from an extended business trip through Europe directly to the convention. He thinks business conditions are no worse here than they are abroad.

W. B. Klee, president of the Damascus Bronze Company, is attending the convention. He has been in Atlantic City for more than two weeks past recuperating from a severe attack of typhoid fever.

George W. Greenwood, traveling representative of the Acme Machinery Company of Cleveland, O., is attending the convention this year, as usual, and while his company has not an exhibit he is very much in evidence.

Charles P. Storrs, the genial and indefatigable general chairman of the entertainment committee, has been given the sobriquet of "Mike" in recognition of his efficient service in increasing the circulation of Mica chimneys.

Ehret Magnesia Manufacturing Company, Philadelphia, is distributing a convenient letter-opener bearing on the handle a relief representation of its works and upon the blade attention is called to Ehret's 85 per cent magnesia coverings.

"Sic 'em Tige" is a part of the exhibit of the Carborundum Company. The vicious animal is tied to the table, which is loaded with beautiful crystals of coke, sand, salt and sawdust, which is one stage of the making of tool grinding wheels.

The aquarium of the Standard Paint Company's exhibit is attracting much attention. The gold fish and pond lilies appear to be enjoying the convention. The "Ruberoid" lining of the fish pond certainly shows the water-proof qualities of the material.

J. B. Doan, vice-president and general manager of the American Tool Works Company of Cincinnati, together with Mrs. Doan and Miss Rebekah Alter, daughter of the president of the company, will sail from England for home July 11 after an extended trip over the continent.

Lost—Paul Weiler and W. H. Coyle, of Franklin Railway Supply Company, have lost their convention badges, Nos. 2669 and 7009, respectively, and request the finders to return them to some member of the enrollment committee. No. 7009 is a transportation committee badge.

That one may use measured words when he writes, the Safety Company, New York, is presenting a neat leather case containing a pencil and a six-inch steel rule to callers who visit the booth where Pintsch light is rivaling the brilliancy of the sun.

Superintendent Cross of the apprenticeship exhibit has devised a clever scheme of guarding his booth. By leaving the entrance chains down at night he figures that the appearance is such to lead burglars to think him behind the rail with a big stick.

The souvenirs of the Parkesburg Iron Company, which yesterday consisted of test pieces of charcoal iron skelp and other articles, have been supplemented by cut roses, which it will afford the company much pleasure to present to the ladies of the convention.

American Steel Foundries, including the Simplex Railway Appliance Company, have a neat and useful souvenir of which each member of the associations is receiving one. It is a "Diamond Edge" pocket knife in readiness for use and with blades of the best Sheffield crucible cast steel.

Bill Sanderson, of the Carborundum Company, generally known in the sunny south as "Grindstone Bill," arrived in the city on Wednesday. Bill is a regular attendant at the conventions. He is furnishing his friends amusement in having them brush the Mississippi sand flies off of his collar.

The "Old-Timers" register did not contain the name of J. Seaver Page, of F. W. Devoe & Co. Perhaps Mr. Page feels too youthful to admit the 36 years he has attended the M. C. B. and M. M. conventions, but there are other old timers who do not forget that he has always been here since they can remember.

Lost, strayed or stolen—One badge belonging to George N. Riley, treasurer of the Railway Supply Manufacturers' Association. Was last seen at the pier on the evening of the annual ball and disappeared from there or from the Boardwalk after the ball. Finder will please return to the treasurer's office.

B. E. D. Stafford, the genial general manager of the Flannery Bolt Company, Pittsburg, is saying less about the Tate flexible staybolt this week than he expects to say next week when attention has been turned from the rear to the front end of the train and the minds of his visitors are

in a more receptive mood. Mr. Stafford is the modest possessor of a talent which he finds little opportunity to use in his present business. He can draw, in a highly artistic manner, anything from a cartoon to a check, but as he says the flexible staybolts do not "draw" there is little encouragement to keep in touch with art. He is assisted at his booth by J. Rogers Flannery, general sales agent; H. A. Pike, Tom R. Davis and William M. Wilson.

The treasurer and the enrollment committee with their assistants desire it to be distinctly understood that they are a direct importation from France and that no English need apply. The names include: Messrs. Riley, treasurer; Conway, assistant to treasurer; McNulty, chairman enrollment committee, and Mowry. The girls of the cast are: Misses Healy, Hallahan, Kane and Finnerty, while the services of maid and watchdog are performed by one Mike O'Toole.

This is the first opportunity which some of the many friends of Charles Elliott have had to congratulate him upon the recent organization of the Maryland Railway & Electric Supply Company of Baltimore, of which he is president and general manager. Arrangements for several important agencies for the southern and eastern territory have recently been concluded, and but a few more desirable accounts are now to be added. Mr. Elliott's own genial presence is the company's only exhibit this season.

Houdini, the famous jail-breaker, has accepted the challenge of the Pittsburg Automatic Vise & Tool Company, to escape, while handcuffed and fettered, from the embrace of four of the largest vises ever built after being securely locked in the jaws of the vises. The trial will take place on Tuesday evening at about 10:30 o'clock in the course of a performance on the stage of Young's pier theatre (next pier east of the convention pier). These vises are claimed to be the strongest made and the exhibition should be of considerable interest.

The Galena-Signal Oil Company, Franklin, Pa., has departed from the general order of exhibitors by devoting space 537-543 to purely social entertainment. The booth is gorgeously furnished in royal Kermanshah rugs; French hand-woven tapestries; and antique Indian, Japanese hinoky and Damascus pearl-inlaid furniture. The large hand-carved center table is one which was used by royal families of India. Its carvings represent ancient gods. The Galena-Signal Oil Company extends such a welcome to visitors as only the genial gentlemen of the Galena Company are capable of dispensing.

H. L. Beeler, the genial sales manager of the Bickford Drill & Tool Company of Cincinnati, has developed into a night worker. He has been seen but little in and around the exhibits in Machinery Hall during the day, but has been observed always "on the job" at night. Mr. Beeler arrived in Atlantic City June 10, and has had entire charge of the installation of all the exhibits of the Cincinnati machine tool manufacturers. Transferring heavy tools from the cars to Machinery Hall on the pier, installing them and putting them in operation is a good deal of a task and Mr. Beeler's successful work has received much favorable comment.

B. W. Frauenthal, Union station passenger ticket agent at St. Louis and secretary of the St. Louis Railway Club, arrived on Thursday, and is at the Dennis. He delivered an address on Saturday night at the annual dinner of the Society of Railway Club Secretaries on "Compensation and Its Law." Mr. Frauenthal spent a good part of Friday seeing the exhibits, and expressed astonishment at the magnitude of the show. Besides being a successful railroad man and a railway club secretary without any superiors, Mr. Frauenthal is a pretty active politician down in Missouri. The ability as a speaker that he will exhibit tonight was largely developed on the stump, and there are few politicians of importance in Missouri that dont know "Barney" Frauenthal or that "Barney" doesn't know.

The concert in Entrance Hall on Friday night proved to be one of the most pleasing musical entertainments ever given in connection with the mechanical conventions. Mr. Herbert's interpretation of selections from his own comic operas, of which the programme was mainly composed, was of peculiar interest, and the popular character of the programme, combined with its brilliant rendition, made it extremely enjoyable. Mrs. Mary Jordan Fitz-Gibbon's solos proved to be among the most attractive features of the programme. She has a contralto voice of much power, wide range, and a very rare richness and sweetness. She has, besides, personal charms and a queenly stage presence that have more than half won an audience before she has begun to sing.

Smiling is the order of the convention. The Commonwealth Steel Company thinks so and this is why we know it—

My friend, when you are glum and blue,
When life don't seem worth while,
The quickest way to make things right,
Is smile, then smile—just smile.

The world is not half bad, and you
Have everything to win,
And you can conquer troubles by
A broad, good-natured grin.

—G. Howland Cox, Jr.

Tuesday, June 23.

This morning during the regular band concert at 11 o'clock on the convention pier, Vesella will play a lot of old time favorites that everyone knows and can sing. This was one of the hits of last year's convention and will doubtless be enjoyed by a big crowd today.

Convention Announcements.

The registering booth will be at the entrance to the pier. Each member immediately on arrival, should go to the registering booth, enroll his name and procure the proper badge.

Those who attend the Master Car Builders' convention also should register twice, once for each convention,. Those who attend this convention only need register but once. This is necessary in order that a proper record may be kept of the attendance at each convention.

Introduction Committee.

An Innovation will be introduced at the Master Mechanics' ball this evening, which it is hoped will tend to increase the sociability of the affair. An introduction committee, consisting of W. J. Walsh, chairman; C. M. Garrett, P. J. Mitchell, J. L. Connors and C. W. Old, who may be identified by the red ribbon streamers on their lapels, will be stationed near the band stand. It will be their duty and pleasure to find partners for all convention guests wishing to dance. It is hoped that all guests who are not widely acquainted will help this committee by introducing themselves to the committee men and indicating their willingness to be introduced to partners.

Railway Club Secretaries.

At the annual meeting of the Society of Railway Club Secretaries, held last Saturday at the Hotel Brighton, the New York, New England, Canadian, Central of Buffalo, Pittsburg

and St. Louis clubs were represented. For the past year or two the matter of standardizing the size, form and material of blank forms has been undergoing individual study and resulted in the recommendation of blanks that it is believed will be generally satisfactory.

The advisability of holding a semi-annual meeting was discussed and left to the discretion of the chairman and secretary. If no meeting is held in six months they are to select an orator for next year.

These officers were elected for the ensuing year: Chairman, James Powell; vice chairman, B. W. Frauenthal, St. Louis; secretary-treasurer, Harry D. Vought, New York.

The annual dinner of the Society was held at the Windsor hotel on Saturday night. Chairman Powell was toastmaster, and B. W. Frauenthal, of St. Louis, read an excellent paper entitled "Compensation and Its Law," which was directed mainly to showing how, in the transportation world as elsewhere, good conduct and bad conduct bring their own rewards and their own revenges. Eugene Chamberlain, Colonel George A. Post and Daniel M. Brady also spoke. Mr. Post and Mr. Brady dwelt especially on the need for co-operation by railway supply manufacturers with railroads to prevent railroad regulation harmful to both.

The Story of a Telegram.

This is the story of a telegram—or at least a part of it. On Wednesday evening the following message, bearing all the ear-marks and check-marks of legitimacy was delivered to the treasurer of the Railway Supply Manufacturers' Association:

Chicago, June 17, 1908.

Geo. N. Riley,
Marlborough-Blenheim Hotel,
Atlantic City, N. J.

Have nominated Taft on fourth ballot as per yours today.

H. S. Boutell,
Chairman.

After the first and second bursts of cheering with which the reading of the telegram was greeted had died away, one of the members of the party turned to his neighbor and remarked regretfully: "Well, here goes my $200. I was dead sure Taft would be nominated on the first ballot," and produced and handed over the $200. What happened subsequently owing to the unexpected exhibition of large wealth in public and under such circumstances tended to cast a veil of obscurity over details. After a careful perusal of the papers next morning, however, a demand was made for the return of the money, and then the fact was disclosed that a large gap had been made in the amount which the premature winner of the bet refused or was unable to make good. Further developments are expected and the telegram, now in the hands of Mr. Riley will probably be submitted to experts for a decision as to the degree of responsibility resting upon those who accepted as geniune an announcement of a fact which could not possibly have taken place.

Annual Meeting of the Manufacturers' Association.

The annual meeting of the Railway Supply Manufacturers' Association was held in the convention hall on the convention pier at 11 o'clock on Saturday morning. President Walbank presided and Mayor Hoy of Atlantic City delivered one of his felicitous addresses of welcome. The reports of the district meetings of Friday, which were fully recorded in the last issue of the Daily Edition of the Railroad Age Gazette, were received and approved. President Walbank read the report of the executive committee, which was received and placed on file.

The annual election resulted in the choice of the following officers for the ensuing year:

President—Alex. Turner, Galena-Signal Oil Company.

Vice-president—A. L. Whipple, Forsyth Bros. Company.

Treasurer—R. H. Weatherly, Scullin-Gallagher Iron & Steel Company.

The election in each case was enthusiastically unanimous and reflected the confidence of the members of the association in the officers just selected, all of whom have been hard working members of several committees for years past.

The feature of the meeting was an address by George A. Post, president of the Standard Coupler Company, on the opportunities and duties of the representatives of the railway supply business in helping to bring back prosperous times. Mr. Post's speech is printed elsewhere in this issue.

D. M. Brady, of the Brady Brass Company, followed Mr. Post with some remarks urging all supply men to adopt the suggestions contained in Mr. Post's address.

On motion of Willard A. Smith of the Railway and Engineering Review an invitation was extended to the members of the American Society for Testing Materials, the annual meeting of which will be held in Atlantic City this week, to visit and inspect the exhibits as the guests of the Manufacturers' Association.

Before the meeting adjourned Scott H. Blewett, of the American Car & Foundry Company, proposed a resolution thanking President Walbank and his associates for the exceptionally successful results that they had obtained in conducting the affairs of the association during the year.

Cornell Alumni of the Railway Mechanical Associations. Cornell Dinner.

The annual dinner of the Cornell men in attendance on the convention, held at the Windsor Hotel on Saturday night, June 20, surpassed in attendance and enthusiasm any of the former meetings of Cornell men at the railroad conventions. The organization, which was made permanent last year, is in a very flourishing condition and a number of new men was added Saturday night. In addition to the regular college songs, sung with perhaps more vigor than musical art by the old grads present, the Criterion Quartette, imported from New York especially for the occasion, and C. L. Safford, contributed their most entertaining efforts toward making the dinner a success.

In continuation of the permanent organization E. H. Sibley, Galena-Signal Oil Company, was elected president and E. A. Averill, American Engineer and Railroad Journal, was re-elected secretary and treasurer.

The speeches by the members were entirely informal and were helped out by the very welcome talks by George Post and Eugene Chamberlain.

The Cornell men present were: F. M. Whyte, N. Y. C. Lines; F. F. Gaines, Central of Ga.; B. P. Flory, Cent. of N. J.; E. H. Sibley, Galena-Signal Oil Company; J. A. Pilcher, N. & W.; J. F. DeVoy, C. M. & St. P.; L. A. Shepard, Atha Steel Casting Company; C. W. Olds, American Steam Blower Company; C. P. Storrs, Storrs Mica Company; C. H. Thomas, Standard Paint Company; J. H. Milcher, Pressed Steel Car Company; N. S. Ruder, Canada Car Company; Geo. Post, Jr., Standard Coupler Company; R. L. Gordon, Standard Steel Car Company; H. G. Macdonald, Standard Steel Car Company; A. S. Blanchard, The Atha Steel Casting Company; Geo. T. Johnson, Buckeye Steel Casting Company; R. S. Cooper, Independent Pneumatic Tool Company; N. S. Austin, Westinghouse, Church, Kerr & Co.; J. D. Ristine, Lowe Bros. Company; C. W. Everson, Haywood & Co.; W. H. Baldwin, Adams & Westlake Company; L. J. Hibbard, American Brake Shoe & Foundry Company; F. C. Wight, Engineering News; F. C. Lippert, Falls Hollow Staybolt Company; Thos. Farmer, Cons. Car Heating Company; L. H. Snyder, Jos. Dixon Crucible Company; A. C. Morgan, Chicago Varnish Company; J. H. Klink, Westinghouse Electric Company; E. A. Averill, American Engineer & Railway Journal.

THE ANNUAL BASEBALL GAME.

The baseball game this year was between teams representing the Master Car Builders' and Master Mechanics' Associations and the Railway Supply Manufacturers' Association, instead of between teams representing the supply men of the east and of the west, as in previous years. The game took place on Saturday evening at 3 p. m. at the Atlantic City baseball park. The parade, composed of Vaselli's band, the score card girls, the two baseball teams, an improvised band composed of supply men disguised as harvest hands and a long line of baseball rooters, left the Marlborough-Blenheim hotel at 2 o'clock and marched to South Carolina avenue and the Boardwalk, where special street cars were in waiting to take them to the ball park.

The result of the battle and a large amount of incidental perspiration was a score of 29 to 19 in favor of the supply men. The game was called at 3 o'clock by umpires T. B. Purves, Jr., of the Denver & Rio Grande, and Frank A. Barbey, of Thomas Prosser & Son. While the game progressed the harvest band discoursed stirring music, including such thrilling airs as "After the Ball," and "My Old Kentucky Home," that inspired the sweating gladiators in the arena below to play ball as it has seldom been played. The correctness of the statistics regarding errors given herewith is not vouched for, as the new adding machine bought for the occasion wore out before its work was done.

The game by innings was as follows, with some omissions:

First inning: Carmen, who was the first man to come to bat for the supply men, led off with a 2-base hit, and reached home on a 3-base hit by Driver. Captain Midgley followed with a 3-base line hit, and got home on a wild return of the ball. Hibbard soaked the ball half way to New York for a home run. Sawyer made a safe hit, but was caught out while monkeying around third. Ristine made a 1-base hit, and reached home after safe hits by Gernon and Spalding, both of whom scored on Carmen's 3-bagger. Carmen was lost to the score card at third. Driver was left on base when Captain Midgley was called out for changing his position at the bat.

Hinckley, the first man at the bat for the railroad men, walked to first, as did Passmore. Captain Wildin shattered the circumambient atmosphere three times and was called out. Tuma made a safe hit, but Clancy, who ran for him, got caught at third. Downing, who got his base on balls, was put out while stealing third.

Second inning: Hinckley went into the box for the railroad men, and threw league ball. Hibbard and Martin fell victims to his curves, and Sawyer walked to first. Ristine, Gernon and Spalding found the ball, and made safe hits, and all made runs. Carmen struck out.

Dodds emulated the celebrated Mr. Casey at the bat, and retired to the shade of the grand stand, and Schlafge emulated Dodds. Oviatt knocked three large holes in the air without finding the sphere, and thus ended the second inning.

Third inning: Driver got his base on balls, and in trying to take two more bases on Midgley's single to center was thrown out at third. Midgley stole second and got to third on Hibbard's hit to right, and was caught between bases while doing a tight rope stunt between third and home, almost the entire railroad team getting in at the round up. Catcher Oviatt muffed the ball at the psychological moment and Midgley scored. Martin and Sawyer struck out.

Hinckley's high fly was caught by Spalding. Passmore made a 2-bag hit, and got home by fast sprinting on a safe hit by Captain Wildin to center. Goodnow, who had taken Tuma's place, followed and futilely beat the air three times. Downing got to first, but Dodd mightily swatted the atmosphere thrice, and Wildin and Downing died on bases.

Fourth inning: Doran, who took Ristine's place, made a safe hit. Chandler ditto. Spalding acquired a base on balls, filling the bases. Carmen hit her hard to left center, and the bases were emptied by three scores. Driver made a safe hit to right. Midgley put whiskers on the ball with a drive between short and third, bringing in Carmen and Driver, and later scoring on a 2-bagger by Hibbard, who scored on a 2-base hit by Martin. Sawyer got his base on balls, but was put out while trying to steal second. Doran made a safe hit. Chandler struck out. A large accumulation of errors, accompanied by enthusiastic thumping of the ball, made the number of runs in this inning 10 and the score at its end 22 to 3 in favor of the supply men.

Midgley began to pitch, and the railroad men's score began to grow. The second half of this inning was extraordinary for counting up 13 runs, not to mention six outs, when there oughtn't to have been but three. The hits were as follows: Dodds, 2; Wildin, 2; Goodnow, 1; Downing, 2; Wilt (who had taken Schlafge's place), 2; Oviatt, 1; La Mar (who had taken Kells' place), 2; Hinckley, 1; Passmore, 1. Midgley unexpectedly braced up, and Hinckley, Passmore and Goodnow successively succumbed to his terrible arm.

Fifth inning: Driver made a 2-bagger, and Midgley put a new set of whiskers on the sphere, making his fourth safe hit. Hibbard fanned. Martin got his base on balls. Sawyer struck out, Doran ditto.

Chandler began pitching for the supply men. Hinckley nailed the ball for a 2-bagger, and scored on Passmore's 2-base drive. Wildin fanned. Goodnow walked to first. Downing made a safe hit, bringing in Passmore. Dodds brought in Downing with a safe hit, but was himself corraled at third.

RAILROAD MEN'S TEAM.

	AB.	R.	H.	PO.	A.	E.	SB.
T. P. Hinckley, s.s., p., C. H. & D. R. R.	4	3	3	2	1	0	0
H. E. Passmore, 2b., c., T. O. Cent. R. R.	4	4	4	6	3	0	1
Geo. W. Wildin, captain, 1b., N. Y., N. H. & H.	4	1	2	5	0	0	1
Frank Tuma, p., Erie R. R.	1	0	1	0	0	0	0
I. S. Downing, c.f., 2b., L. S. & M. S.	4	2	3	0	3	2	0
E. I. Dodds, 3b., l.f., Erie R. R.	4	2	2	0	0	1	0
Wm. Schlafe, l.f., Erie R. R.	2	1	0	2	1	2	0
H. C. Oviatt, c., N. Y., N. H. & H.	4	1	1	0	0	2	0
W. Kells, r.f., Lehigh Valley R. R.	1	0	0	0	0	1	0
T. H. Goodnow, c.f., L. S. & M. S.	3	1	1	0	0	0	0
W. L. Wilt, 3b., Penn. R. R.	2	2	2	0	0	0	0
A. La Mar, r.f., Penn. R. R.	2	2	2	0	0	1	0
Total	35	19	21	15	8	9	2

SUPPLY MEN'S TEAM.

	AB.	R.	H.	PO.	A.	E.	SB.
C. H. Carmen, l.f., Rutherford Autom. Connector Co.	5	2	2	3	2	1	1
T. W. Driver, c., Patton Paint Co.	5	3	4	4	0	4	2
S. W. Midgley, Capt., 2b., Curtain Sup. Co.	5	4	4	1	0	0	4
L. J. Hibbard, s.s., L. J. Hibbard Co.	5	2	3	1	3	3	1
E. J. Sawyer, 1b., Com. Acetylene Co.	3	1	2	2	1	1	1
J. D. Ristine, c.f., Lowe Bros. Paint Co.	3	2	1	0	0	0	1
G. E. Gernon, p., Gisholt Machine Co.	3	2	0	0	0	0	0
C. Spalding, r.f., Gisholt Machine Co.	4	3	3	0	0	0	0
Geo. J. Chandler, Sub.f., Sterling Steel Foundry Co.	2	1	1	0	0	0	0
H. Doran, Sub.f., Com. Acetylene Gas Co.	3	2	2	0	0	0	0
Frank Martin, Sub.f., Jenkins Bros.	5	3	2	7	1	0	0
Totals	43	25	24	18	7	9	10

Umpires: T. B. Purves, Jr., D. R. G. R. R. and Frank A. Barber.

SCORE BY INNINGS.

	1	2	3	4	5
Supply Men	8	3	1	10	3—25
Railroad Men	2	0	1	13	3—19

Summary: Home runs, Hibbard; 3-base hits, Midgley, Driver; 2-base hits, Carmen, Hibbard, Midgley, Driver, Martin, Spalding, Wildin, Passmore, Dodds, Wilt, Downing. Struck out by Hinckley, 8; by Gernon, 6; by Midgley, 3.

Notes of the Game.

The following were score card girls: Mrs. George W. Wildin, Mrs. C. B. Young, Mrs. F. O. Brazier, Mrs. O. M. Deems, Mrs. A. L. Whipple, Mrs. J. M. Stayman, Mrs. S. W. Midgley, Mrs. Charles P. Storrs, Mrs. Dearstein, Mrs. Archibald, Miss Dow, Miss Ethel McIntosh, Miss Garstang, Miss Pratt, Miss Moran, Miss Brazier, Miss Walsh, and Miss Fowler.

The line-up of the band was as follows: J. C. Younglove, alto and manager; J. T. Cavanagh, cymbal; "Bud" Keys, first alto; E. H. Walker, solo cornet; J. Will Johnson, slide trombone; Bertram Berry, solo alto; T. C. DeRosset, piccolo; E. P. Wells, slide trombone; Clayton W. Old, solo baritone; W. H. Coyle, E. bass; J. Sinkler, tenor; T. Farmer, tenor; George Bryant, B. B. bass; Ross Hayes, alto; C. H. Jenkins, flageolet; George Post, Jr., bass drum; J. L. Connors, trap drum.

The fruit cake which is being served at booth 311 of the Commonwealth Steel Company, has that "mother-used-to-make" taste.

MASTER MECHANICS' ASSOCIATION.

Proceedings of the First Session of the Forty-first Annual Convention.

The first session of the forty-first annual convention of the American Railway Master Mechanics' Association was called to order at 9:30 a.m. on Monday, June 22, by the president, William McIntosh, superintendent of motive power of the Central of New Jersey.

The chair invited the past presidents of both the Master Car Builders' Association and the Master Mechanics' association, the president of the Master Car Builders' Association and the members of the executive committee of the Master Mechanics' association to take seats on the platform.

Prayer was then offered by the Rev. J. H. Setchell.

Mayor Stoy of Atlantic City welcomed the association in his characteristic style and J. F. Deems (N. Y. C.) returned thanks on behalf of the association.

Mr. McIntosh then delivered his presidential address as follows:

Address of President McIntosh.

Officially and personally I welcome you to the forty-first convention of this association, which has already covered the span of the active life of man and which is ready for its best and most efficient work. You need no word of mine to stimulate or inspire your efforts, but let me entreat you all to remember that because of the greatness of the problems before us, because of the monumental work that is behind us, much is expected of us for the future, and we must make this, and every convention which is to come, more effective than any that have gone before.

Let us remember that this association has seen the small problem grow to be one of the very greatest problems faced by man. Think a moment of the locomotives and trains, the ships, the bridges, the tunnels, the buildings, the cities which we knew as children; think of them again as they have grown to their present state. Statistics are not needed to show that we have a man's task before us. A gray hair or two that speaks of experience is the authority upon which we place before those who are to take our places the rule of life that will be most greatly needed in the future.

Without question our greatest problem is that of the selection, treatment and organization of men. The recent years of abnormal business activity have brought to the surface the slumbering tendency of organized labor to drift away from harmonious relations with employers and array itself on the side of the radical and demagogue, who seek notoriety and selfish advancement in creating and fostering discord between employers and employes whose every interest are identical. We know that any attempt on the part of either to operate independently must result disastrously. The demagogue and the radical lay great stress on the instances where some few in financial and commercial lines have overstepped the boundaries of correct business methods, and these would-be reformers, in their rampant enthusiasm, would destroy the whole business structure, and invite railroad employes to participate in the movement under the vague proposition that in some mysterious way they would be benefited by the catastrophe.

The sovereign remedy is lower tariffs, in the face of low rates and already large reductions from natural causes, and other embarrassment of the railroads with class legislation and impracticable laws, confiscatory in scope and surrounded with political red tape, that would largely increase operating expenses and further reduce earnings. How can employes expect to be benefited by such complications? Their interests are so closely allied with the interests of the company they serve that they must be proportionately affected by reduced earnings. There is no magic way of escaping. The laws that govern are immutable.

The points of issue between railroad companies and their employes are usually few in number and easy of solution. Wages are at present generally satisfactory, and only questions of methods conflict. Mechanics, especially machinists, are reluctant to adopt other than hourly rates of pay, while manufacturers and corporations are in favor of some system of fixed output, profit sharing or piece-work. The men claim, and with some grounds for their contention, that they have frequently been treated unfairly where piece-work has been adopted. This was often owing to bad judgment on the part of local officials in their efforts to adjust piece-work prices that had been established at unreasonably high figures, as a result of the adoption of hurriedly prepared piece-work schedules, or perhaps no schedule at all, merely guessing at prices and then arbitrarily putting them in force. On the other hand, workmen have interfered with normal results by restricting the output, under the mistaken idea that they would benefit thereby. Abnormal rates are bound to result from such methods, and dissatisfaction and protests from the workmen follow, for no matter how fairly and carefully these adjustments are made, the workmen are naturally suspicious that some advantage is being taken of them. It is evident, therefore, that the establishment of piece-work prices should be arranged with the utmost care and deliberation. It must further be borne in mind that agreements to be enduring and stand the test of time should be agreeable to both parties interested, and that due consideration should be given the workmen's side of the question in order to insure this result. Fairly adjusted piece-work rates should prove advantageous to the workmen, enabling them to earn much better wages with but little greater physical effort, only requiring closer mental application and attention to details on their part, while the manufacturers and corporations would be the gainers by having their tools and machinery working at all times to their full capacity.

The only one to suffer under the stipulated output system is the indifferent and lazy workman. There should be no place in the ranks of honest railroad mechanics, nor in the membership list of labor organizations, for the dissolute floater, inefficient imposter and agitator, who demands the highest rate of pay for the smallest return, by him, in labor and its products, giving most of his time and energy to sowing seeds of discord among his fellow workers, seeking to make himself a leader in his organization and always in bitter opposition to the independent workman who prefers to win increased compensation and promotion upon his merits.

There is another kind of workman, however, who should be welcome to both the companies and the unions. He would first be a citizen of good repute, or at least had declared his intention to become a citizen; he should be a good mechanic —his union demands that; he would be a man of good habits —his union requires that, too; he would do an honest day's work, seeing that the tools and machines entrusted to his care were properly handled, and that the latter were always working to their full capacity, and that his employer's interests would be advanced in every way possible. An organization founded on such principles would require no coercion to obtain membership and its members would not be seeking employment, for they would always be in demand. I am confident there is not a member of this Association who would not be glad to secure the services of such men.

In my railroad experience, extending over forty years of active service in different departments and various branches of railroad work, much of the time in charge of large bodies of workmen, I cannot recall an instance where it has not been possible to adjust any of the ordinary differences that arise by free and frank discussion of the questions at issue with the men affected. I, therefore, think the average railroad employe is too intelligent to be led very far astray by scheming politicians or unwise agitators. They must keep in mind that their own and their families' interests are bound up with the company they serve, and that they cannot prosper when the company does not. No doubt they have grown up in the service, and their fathers before them. Many of the present officials have been advanced from their ranks and there should be no reason why they too should not become officials in due time. Then why should they combine with those who would embarrass the company, when their every interest is with it and against such a proposition? Officials and workmen should join hands and stand shoulder to shoulder against this common enemy and resist, by every honest means, its efforts to handicap their prosperity. One year ago there were, approximately, 1,600,000 railroad employes in this country, and their influence prevails wherever civilization and commerce extends. Their efforts unitedly directed to protect the railroads from unjust attack would exert such restraint upon the radical, of whatever class, as to cause him to stop and consider and modify his actions to conform to fair dealing and the interests and wishes of those employed by the companies, and depending upon their success for support for themselves and their families. The folly of workmen assisting in directly or indirectly curtailing the earning capacity of the railroads, and at the same time expecting to continue to draw the liberal wages they were receiving when earnings were good, is about as ridiculous as the tailor to expect golden eggs after he had killed the goose that laid them.

My honored predecessor pleaded eloquently for a man. He said, "We have inherited. What shall we bequeath?" Yes, we want many men, both in command and in the ranks. Wise men, strong men in their respective lines, reasonable men and independent men, who would respect the rights of others as readily as they would contend for their own. We must have young men qualifying themselves for advancement, young men with patience and determination to work up, step by step, to the most important positions. It should not be necessary to seek beyond their ranks for selections to fill

positions that become vacant. There should be a waiting list of men available. Each of us who now occupy official positions should have his own successor selected, so far as it is possible to prepare and qualify him by training for the position.

No doubt we do not know our men as well as we should, and while it may be impossible to gather this intimate knowledge directly, we can accomplish much by gathering indirect information and keeping systematic records. We perhaps are not training our young men as thoroughly as we should, and to accomplish this result we need the co-operation of managing officials. This will no doubt be forthcoming on proper presentation of feasible plans, as is evidenced by the hearty support given recent liberal methods of training apprentices, now being introduced on several railroads, and which promises to be much farther reaching in satisfactory results than its earlier promoters dared to hope for. Equally liberal inducements, carefully worked out for other departments, would no doubt bring about similar results and well repay the effort. It may not be out of place to mention here that all of our propositions and plans for better conditions will come to naught without the sincere help of those who control the financial affairs of large enterprises.

We require more than men. We need an organization. An organization that develops men; develops them broadly and quickly. We need men of all kinds—leaders and followers. The followers are most important, for if we develop the followers the leaders appear automatically, and consequently take care of themselves.

Let us note for a moment the careful training given young men in many lines of business to qualify them for important positions awaiting—and railroad work is not less important. One of the prominent trans-Atlantic lines has just commissioned a substantial ship for training purposes, and from which will be graduated recruits for the fleet, and in the line of recent experience by railroad companies of the difficulty of securing reliable help, perhaps the time is now propitious for them to take action of the kind suggested, adopting some such system of education, training and promotion that will first induce promising young men to take up employment, then educate and train them in the line of their duties, finally opening up to them a line of promotion that will encourage them to remain permanently in the service and eliminate the growing tendency that now exists of employes seeking other employment as soon as they have gathered an outline of the duties they are expected to perform. Certainly well prepared young men are worth as much to the railroads as they are to other industries to which they are attracted.

It seems fitting to sum up what the man who must assume our duties and responsibilities must be prepared to do. He must prepare himself for leadership by efficient service in subordinate places. He must know men. He must help in building up an organization of men. It is a mistake to always seek genius; it is more important to build up that combination of various abilities, capabilities and temperaments which will form a united, homogeneous body before which the difficulties of the greatest problems will crumble and disappear. We should all strive to build up a working organism which shall be so complete and so satisfactory and with a correct policy so firmly established that those who follow can find little which they will be willing to change or to discard.

It is my earnest hope that I have, in a modest way, brought to your attention a few salient facts that may be suggestive of further and deeper thought along the path outlined, to the end that we may have concerted action in the direction indicated by him whom we all love, Burns, when he pointed out that we are leading steadily, though slowly, to that goal.

"Where man to man the world o'er,
Will brothers be and a' that."

As president of this association I attended the recent conference of state governors which assembled last month at the White House, by invitation of the President, for a discussion of means for the conservation of the resources of the country. Once before, 122 years ago, President Washington called the state governors together, that time to consider the "Development of Natural Resources."

After little more than a century the development in some directions seems to have been too rapid, leading to wastefulness, and it is clear that our resources must be husbanded.

Before the Master Mechanics' and Master Car Builders' associations lies a great responsibility in that we represent an enormous consumption of natural resources. To be faithful to our trusts we must, therefore, use every effort to carry out the spirit which led to the recent conference.

"Conservation of Resources" was the object of the assemblage at Washington. This suggested to my mind the thought of conservation of energy as applied to the problem before the railroad officials of this country. I wish to suggest a thought which is not new, but is, in my judgment, becoming more important every day. My suggestion, briefly stated, is that sooner or later the energies of mechanical officers of railways must be conserved by the concentration of every effort. Sooner or later the Master Mechanics' and Master Car Builders' associations must be consolidated into one powerful, united, representative organization. Let me place this proposition squarely before you by expressing the opinion that the progress of the times, the conditions of our work and the character of our problems demand this step. I will not presume to outline how this should be brought about, but I most earnestly recommend that the executive committee be instructed to raise the question with the executive committee of the Master Car Builders' Association and consider ways and means looking towards such consolidation, which I believe, if we are true to the interests which we represent, must not be long deferred.

I cannot close this address without expressing thanks—which sentiment I am sure is endorsed by the association—to the supply men who are responsible for the wonderful display of railroad machinery and appliances, the greatest ever assembled outside of the world's fairs at Chicago and St. Louis; also to that splendid body of business men of Atlantic City—those hustlers whose co-operation has made it possible.

The minutes of the last meeting were approved as printed and Joseph W. Taylor presented his report as secretary, which gave the following figures regarding the membership: 862 active members, 19 associate members, 37 honorary members, total 918. The secretary's report referred to the death during the year of E. Ryan, L. M. Kidd, O. Stewart, James Macbeth, J. B. Morgan, active members, and M. N. Forney, honorary member.

The report showed that the receipts of the secretary's office for the year had been $5,200.33 and expenses $5,200.33, with unpaid dues amounting to $1,440.

The secretary's report stated that in regard to the scholarships at Stevens Institute, R. W. Pritchard graduated this fall, and that there are now four vacancies in the scholarships. The June examinations are being conducted this week, there being one application from the Master Mechanics' association.

As to the Joseph T. Ryerson & Son Scholarship at Purdue University, the present incumbent following the course of instruction is in his second year, and is the second candidate under the head of the Ryerson scholarship.

The report of the treasurer showed a balance on hand of $1,912.77.

The reports of the secretary and treasurer were received and referred to the "Auditing" committee.

The secretary announced that the executive committee recommended that the annual dues for the present year should be fixed at $5.00, the same as last year, which recommendation was approved.

L. R. Pomeroy, J. W. Fogg and C. H. Snyder were elected as an "Auditing" committee.

The privileges of the floor were extended to W. J. Hurley, representing the Traveling Engineers' Association.

John Medway, who has been a member of the Association since 1888, W. H. Thomas, who has been a member since 1883, and John Player, whose membership dates from 1881, were elected honorary members.

Edward G. Schmidt, associate professor of railway engineering at the University of Illinois, was proposed for associate membership; under the rules action on this will be taken next year.

The chair named G. M. Basford, L. R. Pomeroy and A. E. Mitchell as a committee on "Correspondence and Resolutions" and the following committees on "Obituaries:"

On M. N. Forney, Angus Sinclair.
On E. Ryan, George W. Butcher.
On L. M. Kid, Ben Johnson.
On O. Stewart, A. Montgomery.
On James Macbeth, A. M. Waitt.

The report of the committee on "Mechanical Stokers" was presented by J. F. Walsh (C. & O.)

Theo. H. Curtis (L. & N.): I have been keeping a very close watch of mechanical stokers, hoping that some day we will be able to get a steam shovel that will handle the coal. Up to the present time I have not seen a stoker that seemed to me to fill the conditions. I would like to hear from some of those that have had experience with stokers, and have them state what they are doing in this month of June with them.

G. W. Wildin (N. Y. N. H. & H.): Before I left the Erie they were starting to experiment with a stoker known as the Black, which was got up by a fireman on the road. I do not see it mentioned in this report, and as there are a great

many representatives of the Erie here, I would be glad to hear from them as to how the Black stoker came out.

John Tonge (M. & St. L.): It is my opinion that to use stokers we must have a uniform method of preparing the coal, and that is going to be quite difficult in the West, though not so bad in the East. The next thing to accomplish is to get a stoker that will be placed on the tank, one of these feed machines by which you can dampen your coal and not one that the fireman has to track and shovel in.

Mr. Walsh: As is pretty well known, the earliest and first experiments with locomotive stokers were made upon the Chesapeake & Ohio. The original locomotive stoker was invented by one of our engineers, J. W. Kincaid, and was worked by hand. A little later Mr. Kincaid arranged to have the stoker operated by steam. The valve motion, however, on that stoker proved to be delicate and troublesome. He improved that and made quite a substantial mechanical arrangement of it. We own several of those stokers at the present time. We do not operate any of them, and in order that the reason for that may be understood I will explain that when the stoker was first invented our locomotives were all long fire box locomotives. Our heaviest locomotive was 100 tons approximately, with cylinders 22 by 28 inches. We found it next to impossible to haul the full tonnage (4,000 tons) over a long run with those engines, and make a successful trip with one man firing the engine. The stoker, while crude at that time, applied to those engines did excellent work. We also used it to some extent on our heavy passenger engines, where it also did good work. But with the introduction of wide fire box engines and their installation on those long and heavy divisions, and the transfer of the long fire box engine to short work, so far as we are concerned, and speaking as an individual, not as a member of the committee on stokers, the necessity for the stoker on our road disappeared, because our firemen can conveniently fire the wide fire box 100-ton, 22 by 28-inch cylinder Consolidation engine with 4,000 tons of freight over a 120-mile division. That is the reason for the fact that we are not now using the stokers that we own; and so far as my judgment goes in the matter, and as applied to the Chesapeake & Ohio, we do not think the wide fire box engines need a mechanical stoker.

Mr. Wildin: Mr. Walsh seems to feel that there is only one necessity for a stoker, and that is to keep up steam. I would like to ask if he has discovered that there is no economy in the stoker; that so long as you can keep up steam by hand, it is preferable to do it that way than to use the stoker. Is it not a fact that if you use the stoker you have less effect on the flues from cold air, etc.?

Mr. Walsh: Yes. We could use our flues longer without repairing them, without rolling them; and we showed a slight economy in coal; but we did not consider that either of those things were of sufficient importance to undertake the installation of stokers in a general way, and our main idea was to enable us to work the engines to their fullest capacity, which could not be done with the long fire box engines and a heavy tonnage train. The advantages you gained would be more than balanced by the disadvantages in keeping the stokers in repair. It was found very inconvenient to take care of the stokers at terminals. In general they were unpopular with the firemen. There appeared to be a wrong idea concerning what was proposed to be accomplished by the stoker, and, all things considered, with the transfer of the long fire box engines to the short runs, we did not think there were advantages enough in the stoker to keep it.

L. R. Pomeroy (General Electric Company): If a stoker were being operated on a road in a section where the coal averaged approximately 14,000 B. t. u., would there be any assurance that such a stoker would be good in a majority of places in the country where the coal averaged only 12,000 B. t. u.?

C. A. Seley (C. R. & P.): I think that the stoker is one of the most difficult things to work out, for the reason that its operation cannot be entirely mapped out by experiments with the apparatus except in service. I was struck at former exhibits of stokers to see how admirably the coal was distributed over an area of considerable extent by the throwing of the coal by the machine and apparently filling the fire box perfectly over its entire surface. As a matter of fact, however, we know that in operation the coal is not consumed in that way. The coal is not burned evenly over the entire grate, and the intelligence of the fireman is necessary in order to distribute the coal to those portions of the grate where the combustion is most intense. I am of the opinion that unless a stoker is very efficient in distributing the coal over the entire grate that the flues will be damaged more by air through burned holes, etc., in the grate, than from the door.

F. F. Gaines (Cent. of Ga.): There are on the market for stationary plants underfeed stokers, for which are claimed a good many advantages from them both in the way of doing away with the handling of fuel, also in more perfect combustion due to the gases being distilled in the bed. I believe at least one of these companies is experimenting with an apparatus of this sort for locomotives.

Mr. Walsh: One of our prominent roads is now experimenting with an underfeed stoker, and also with a door feed stoker, the object being, more than anything else, to eliminate smoke at terminals. But, as there has been nothing of a definite nature brought out concerning either of these stokers it was thought best not to touch at all upon them. We have absolutely no difficulty whatever in distributing the coal in the Day-Kincaid stoker just as well as it could be done by hand.

The President: Gentlemen, it seems a little surprising that stokers should be unpopular with the firemen; however, not more surprising, I presume that injectors, side feed lubricators and all of the modern improvements that have been applied to locomotives at different times, proved unpopular at the commencement. The engineers and everybody else condemned them at one time, and they had to grow in favor by familiarity, and I presume the stokers will also become familiar and popular in the course of time.

W. F. Bentley (B. & O.): We have been experimenting, with automatic stokers for about two years, but we have very small engines on our road and have very little difficulty in getting all the firemen we want, and therefore, it is not necessary for us to go into stokers, extensively. We have tried the Strauss stoker and the Crosby. The Crosby was invented and brought out on our road. Like everything else of a mechanical nature it is subject to failure occasionally. We have had them in use probably eighteen months, and they do the work in a satisfactory manner. The only objection we had to it which I think has been overcome, however, was that when working the engine light the stoker had to be taken out and hand firing used.

T. Rumney (Erie): We furnished the "Stoker" committee with all the information we knew of in regard to stokers, and we also gave it a series of tests that we had made covering, I think 18 trips. I don't see any mention of this, possibly because the committee did not think it of sufficient importance. The Hayden automatic stoker was what we used and it certainly stokes—in other words, it will throw coal satisfactorily but it has not shown any economy,—just the reverse. It shows a reduction in economy on the east and west trips of over 15 per cent and we found that every fireman fired the automatic stoker, that is, on 18 trips, 18 different men fired the stoker. Inasmuch as they all fire engines, and they don't all fire stokers, we should naturally expect poor economy. We are continuing the tests of the stoker and we are going to make five more; and we have also arranged so that there will be no hand firing necessary. We made some improvements in the tank, and we are going to supply as coal everything that passes through a 3-inch screen, and we hope to get better results than we have in the past. We have a very heavy division of 140 miles, and we use from 18 to 20 tons of coal in 140 miles when conditions are right for it. We have used coal with only 10,500 B. t. u. per pound and got satisfactory results. The coal we propose to use will probably run 13,000 to 14,000 B. t. u. I have some figures showing the fuel used was per ton mile per hour on the average of all the trips—without the stoker was 5,609 pounds and with the stokers 6,494 pounds showing a reduction in economy of a little over 15 per cent.

W. C. Squire: Is it not possible to reduce the 15 per cent so that it will meet with the personal equation of the fireman himself? There might have been a difference of 25 to 30 per cent which is not unusual.

Prof. W. F. M. Goss (Univ. of Ill.): My experience with the stoker is rather out of date, but some years ago I did have a good deal to do with the Day-Kincaid stoker. I am convinced that we expect a great deal of the stoker designer when we require him to meet the conditions on the normal locomotive designed for hand firing. It is altogether likely that when the successful, satisfactory stoker comes, it may bring with it a demand for changes in the design of the boiler. For example, the success of the Day-Kincaid stoker, and others of that type, would have been much more nearly assured if in applying it to the narrow firebox boilers, there could have been a supplemental fire door; that is, if the stoker could have been put in at the normal level, or a little below it, and then the deck put in a little above that. That would have provided for the normal working of the stoker, and would have given the fireman a chance to reach his fire without the necessity of backing away the stoker.

There is no question about the ability of a number of these stokers to carry the coal into the fire box. The ques-

tion of economy is entirely one of skill and attention in operation. Since the stoker puts the coal into the fire box with very great ease and any lack of attention on the part of the fireman will lead to over firing and fuel waste. I have no doubt that under favorable conditions economy will result in the use of the stoker in locomotive service, as it has under favorable conditions, in stationary service.

It is always dangerous to predict but it seems to me that any type of stoker which involves a long continued process, as is the case with the chain grate, will be confronted with a great many difficulties when applied in locomotive service. The very great changes in condition of load which come upon the locomotive make it absolutely essential that there be provision for rapidly changing the condition of the fire, and the stoker of the chain grate type does not provide such means. The automatic shoveller, however, such as the Day-Kincaid, does meet that condition.

Angus Sinclair: Away back when they were experimenting with various kinds of fire boxes for burning coal an invention was got out by a New York railroad man for burning coal smokelessly on a movable grate. There was some difficulty experienced with the action of the grate in the case of the first inventor, but others took the matter up to some extent, and experimented with the movable grate, as an automatic stoker. It was not done successfully, however, and, as far as I can make out, the influences against it were strong enough to have it thrown aside. The firemen had no particular use for it, and with the small fireboxes in use at that time, there was really no urgent necessity for an automatic stoker.

The revival of the sentiment in favor of automatic stokers came with the very long fireboxes that it was almost impracticable to fire with the scoop, and with that kind of a firebox, the automatic stoker was a success, and had these long fireboxes been perpetuated as the firebox for the freight locomotives of America, you would have the stokers in full blast today. With that kind of firebox it was entirely a success, and much more successful than the hand firing.

When you went to the wide firebox the fireman became superior to the automatic stoker and as long as that condition exists, I do not believe there will be any inclination among railroad companies to use stokers sufficiently to pay for the work done in getting out the stokers.

The mechanical stoker came up to be suitable for a certain firebox, and that firebox only; then another form of firebox came in and the mechanical stoker is not well adapted to the new form of firebox, but the fireman's work is well adapted to the new form of firebox, so there is not an active demand any more for an automatic stoker.

Mr. Gaines: I take exception to Mr. Sinclair in the statement that there is no demand for an automatic stoker. I believe there is a demand in this way—that the limit of a fireman's capacity has been reached on some of our big engines, even with wide fireboxes, in hot weather.

J. F. DeVoy (C. M. & St. P.): I am rather inclined to agree with Mr. Sinclair. If designers would give more attention to the construction of a firebox results can be obtained which will meet all requirements. I believe a firebox with 55 square feet of grate surface will meet all requirements and that a man can fire a box of that size when an engine is developing its maximum capacity of, say, 2,000 horsepower, during the time that the engine is called upon to meet that requirement, which should not be, in any part of the country, more than two hours.

The Milwaukee road has been criticized for insisting on the narrow firebox, but we obtained as good and as economical results with a narrow firebox as with a wide firebox. We believe that the depth of the firebox is most important. Three years ago we were found fault with when we said that a depth of 32 inches from the lower side of the throat to the bottom of the mud ring could be obtained. We have done that and more too, and it has had more to do with the proper combustion than anything else. We have now gone from the narrow firebox to a width of 60 inches. We do not believe that a firebox 75 inches wide is desirable for any service.

J. F. Deems (N. Y. C.): I want to emphasize what Mr. Gaines has said and differ strongly from the remarks of Mr. Sinclair and Mr. De Voy. I am not prepared to say that the stoker is here—in fact I think it is not—but I certainly feel that if there is a demand, an urgent demand, for any one thing on the railroads of this country it is a successful mechanical stoker.

Prof. H. Wade Hibbard (Cornell Univ.): What appeals to me in the mechanical stoker is that it makes the work of the fireman less laborious and more attractive to the brainy young fellows that now do not care to become firemen, because they say it is work for a horse and not for a human being.

L. R. Pomeroy: I was testing a locomotive on one of the western roads on mountain grades; the locomotive had 56-inch wheels, and it also had 56 square feet of grate area, and by the combustion of 150 pounds of coal per square foot of grate area, this engine could maintain its maximum tractive power up to 10 miles an hour, but owing to the inability of the fireman to shovel more than 7,600 pounds of coal per hour it could not realize a speed greater than 7.5 miles per hour. Efforts to develop a stoker should not be discouraged because we are doing a great thing if we can handle one third more coal by stokers, as that would make possible the realization of the full tractive power of the locomotive at slow speeds.

H. H. Vaughn (Can. Pac.): The mechanical stoker has comparatively little interest for us on account of the fact that on the most of our lines the grades are comparatively short and the weather is cool, and the fireman is consequently not very heavily taxed. We have tried one or two devices of stokers, but the men preferred to handle the engine without them.

While the stoker may have certain advantages, there are disadvantages inherent in the use of a mechanical stoker, at any rate with the present design of boiler that must make it more or less objectionable. I do not see how a man is going to obtain an absolutely uniform firing over long divisions, and meet the same demands of firing as he can with hand firing, and I do not see how a man whose fire gets into bad shape can get it into good shape as well with the mechanical stoker as he can with hand firing. Hand firing, to be sure, is very laborious, but it requires a good deal of brain power to do it properly. If more brain power was used in conjunction with the physical power, firing would not be so laborious, and the fireman would get along better.

The proposal of Dr. Goss strikes me as the most favorable in the stoker line—an arrangement that would deliver a certain proportion of the coal, to be supplemented by hand firing. If an apparatus could be designed, reliable enough to give us a portion of the coal fed automatically, and let the fireman supplement that with hand firing, he would have a chance to do hand firing to the best advantage when and where it is needed most—to cover up bright spots—and the fireman with that portion of the firing which was done by hand, could keep the fire in good condition for considerable time.

Under our system, of pooling engines, and with the amount of maintenance that our American engines are receiving, it is certain that the addition of a stoker on an engine will lead to more round house work, and occasionally failures, and it is the failures that condemn most devices. Where the men consistently and continually oppose a device, there is nearly always a reason for it which the officials do not know. Even though you put appliances on your engines, or anywhere else, and you think they are all right, and even though you get good reports of their service from your master mechanics, yet if your men dislike them and object to them, you will always find there is sufficient ground for the dislike, and I think the objection to the mechanical stoker is that it really needs a certain amount of hand firing to keep the fire in shape.

S. M. Vauclain (Baldwin Loco. Works): It has been very amusing, and also very instructive, to listen to some of the views which have been expressed in regard to automatic stokers by the gentlemen present. I do not think that any of them need worry very much, judging from the particular standpoint which they took in discussing the subject. I think that if an automatic stoker can be made which will properly stoke the locomotive, that there will be no difficulty in introducing them, and they will not only be sought over by those who have charge of locomotives, but they will also be asked for by those who are to operate them.

I think it is unwise to stop experimenting with automatic stokers for locomotives just as it would have been unwise to stop experimenting with automatic stokers and movable grates for stationary purposes. The problem, however, is somewhat difficult, and, in order to have an automatic stoker entirely successful, it would appear to me as though the design should contemplate conducting the coal from the tender to the fire box without physical labor. So long as physical labor must be employed to place the coal in the stoker, and look after the many peculiarities that the machine itself may have while it is operative, I think we will continue the firing of our locomotives by hand.

G. R. Henderson: There is no question but that the automatic stoker to be successful, must handle the coal, from the tender into the stoker, and I believe there are some stokers in the market which are now doing that. I think the principal trouble with the stoker Mr. Wash referred was the management of the company organized to take care of the stoker, and to put it on the market. The

capacity of a fireman is about 3,000 pounds of coal an hour. We can burn in locomotives 200 pounds of coal per square foot of grate area per hour, and certainly 100 pounds of coal per square foot of grate area per hour is not excessive. The Mallet engine listed on the Erie only burned 50 pounds of coal per square foot per hour. It is evident the fireman could not get more coal into it. If the engine had been provided with some kind of mechanical stoker, which would have supplied it with all the fuel it could have consumed, it would have gone up the hill at 12 miles an hour, instead of 6, and it would have accomplished double the work for the same time.

On motion the present committee on "Mechanical Stokers" was continued and made a standing committee.

Theodore H. Curtis, chairman of the committee on "Blanks for Reporting Work on Engines Undergoing Repairs," presented the report.

Discussion on Blanks for Reporting Work on Engines.

F. F. Gaines (Cent. of Ga.): I have been on a road on which we had between 1,000 and 1,100 engines. We found it absolutely necessary to know each day what portion of the engines we could count on for service, so that if a congestion occurred on one section, and needed more engines, we could supply them. Since that time I have been connected with a smaller road which has a smaller number of engines, and I find my daily report of the condition of the engines a very important document. We take a report blank similar to exhibit B; it is made up some time each afternoon and I receive it the next morning, and I know what engines have been shopped, and what engines are in the shop for light repairs and what engines have been turned out. If the general manager should call on me quickly to know if I can spare some engines, and send them to a point where there is a congestion, I am able to size up the situation and tell him at once what can be done. I do not see how without some report of this kind, you are going to give information to the general officers regarding the condition of the motive power when they call upon you for such information.

Mr. Curtis: In that respect the committee feels that reporting the daily conditions of locomotives, in respect to what Mr. Gaines desires, is entirely a local matter. On the Louisville & Nashville Railroad the master mechanics report to the division superintendent each morning the condition of the locomotives on that division and the division superintendent reports to the superintendent of transportation, the number of locomotives available, the same as he does the number of cars, and the mechanical department does not pay any attention to that item daily in regard to the number of locomotives on hand for service.

G. W. Wilden (N. Y. N. H. & H.): I hardly think we will ever get to a standard form of reporting matters of this kind that will be suitable for all roads. I feel the superintendent of motive power or mechanical superintendent should be fully advised every morning as to the whereabouts and the condition of his power, and it is necessary also for the transportation department to know if there ever comes a block, the first man jumped on is the superintendent of motive power. I believe that it would be pretty hard to operate a railroad where there is heavy traffic without the mechanical officer having a daily report showing what engines are in the round house for repair and when they are expected out and he can tell then whether it will be necessary to shift power or whether he can supply the demand from that point.

Professor Hibbard: I would suggest a diagram for reporting this information and I believe that in a few years from now we shall see those reports and information presented in graphical form for immediate and suitable consideration by the official that needs to study the facts.

We get daily reports regularly showing locomotives in the shops, when they will be out; those in the round house, when they will be out; cost of repairs, etc., and the number of engines awaiting the shop; but as to the distribution of power upon our system, the mechanical department does not enter into that matter. That is a transportation matter and is handled by the general manager and the superintendent of transportation. This is the practice on the Chesapeake & Ohio. I get a telegraphic report every morning showing just what engines are in a certain round house, when they went in and when they will come out. That, I think, is an essential report.

Mr. Curtis: In closing this report I will only emphasize what I said before, that I think the reports are largely local; and as Mr. Wilden has said that he desires to know what engines are in the shop for a short period of time and when they will be ready for service. That is well enough; but I think all mechanical departments are doing all they can to get the engines ready for service and to get this report as to when they will be out doesn't benefit us very much, as they will be out as soon as they can; and furthermore on a railroad like the Chesapeake & Ohio, or the Louisville & Nashville, where the locomotives are handled by the general manager and the superintendent of transportation, there is but little need for the mechanical department to know the exact daily condition of the locomotives. However, this may be done locally to good advantage.

The President: The next subject is the "Proper Width of Track on Curves to Secure the Best Results with Engines of Different Lengths of Rigid Wheel Base."

The Secretary read the following letter from F. M. Whyte, chairman of the committee:

"The committee of the Master Mechanics' association appointed to confer with a committee of the American Railway Engineering and Maintenance of Way Association concerning the widening of gauge of track at curves begs to report progress and to suggest that a committee be continued to represent this association in the joint committee.

"Several of the standards of this association are accepted siderable progress was made, but there remains to be done some work in which a committee of this association can be of assistance.

"Several meetings were held during the year and confrom the standards of the Master Car Builders' Association, and it is found that some of the standards which are under discussion by the joint committee are those of the Master Car Builders' as shown on M. C. B. Sheet 12 and that, therefore, the joint committee should include representatives from the Master Car Builders' Association. Correspondence is being had with the Master Car Builders' Association suggesting that that association appoint a committee to represent it in the joint committee.

"The study made so far indicates that the subject is an important one and should receive the attention of all three associations."

Mr. Setchel (Cuba, N. Y.): On motion the report was received and the subject continued as recommended.

Topical discussion on "The Smoke Nuisance" was next in order. W. E. Squire in connection submitted his paper on "Fuel Economy."

This was followed by the topical discussion on "Alloy Steel." The convention then received the report on "Washing Out Locomotive Boilers," which was presented by H. T. Bentley.

Discussion on Washing Out Boilers.

After the reading of the report, Mr. Bentley continued as follows:

Since writing this paper I have had opportunities of seeing in operation hot water wash-out plants that actually do in a very satisfactory manner all that the most sanguine would expect. At one place I found the steam and hot water being utilized to heat two tanks, one to a temperature of 140 degrees F. for washing out and the other at from 175 to 200 degrees for filling up, and there appeared to be plenty of hot water at these temperatures to meet all the requirements.

In figuring on the actual saving in time, coal and water, the amounts given by your committee are probably under instead of above the mark and we would revise these figures as follows: Labor, 30 cents; water at 7 cents per 1000 cubic feet, 14 cents; coal at $2.00 per ton, $1.00; total per engine, $1.44.

Just at present, owing to the business depression, we are not crowded for power, but in busy times anything that will enable us to turn an engine out in one half the time, after being washed, is worth considering.

One thing that impressed me in connection with the filling up of boilers was the large sized pumps used, which made it possible to fill a large locomotive boiler in nine minutes, where the best we now do is about 20 minutes.

A larger blow off pipe than 1½ inch as used on most roads is very necessary for quickly emptying and filling boilers.

The reduced amount of boiler work necessary is evidenced by the number of men laid off since the introduction of hot water washing out, at several places investigated.

The men handling the hose can do so without inconvenience, where the temperature does not exceed 140 degrees F., but in filling up, where the water is as hot as 200 degrees, it is not necessary to handle the hose, and therefore no trouble is experienced.

The savings from coal, water and labor alone will pay a handsome interest on the cost of installation and we have no hesitation in recommending this system, where economical results are desired.

G. R. Henderson: I am very much interested in the last portion of Mr. Bentley's discussion regarding the plant which he recently installed, and I think it would be interesting if he would give us more of the details. There are several

suppose there was a line of pipe to run the water from the blow-off tank, and another line for washing out. Is there not another pipe for the higher temperature water? If Mr. Bentley will give up a little of the details of what the lines were in this connection, it would be very interesting. It is of great importance and we should get all the information we can out of it. How many lines of pipe are used?

Mr. Bentley: A connection from the engine to the first tank, and from that to the second tank. The first tank contains the washing out water and the second tank contains the filling up water, and of course there is a blow out line from the engine to the first tank, and after the water in that tank is brought up to a temperature of 140 degrees a thermostat shuts the water and steam off from that tank and diverts it to the other tank where the rest of it is utilized. Then the same pipe that is used for blowing off the water is used for refilling the boiler.

Mr. Henderson: You cannot blow off one engine and wash out another at the same time?

Mr. Bentley: I think you can.

Mr. Henderson: It takes two lines of pipe? In a large roundhouse they could treat two or three engines at the same time probably.

Mr. Bentley: I am not entirely sure, but it seems to me two engines can be washed out at the same time—one blown off and the other washed.

Mr. Henderson: Do they use the same water that came out of the boiler, or use heat to heat up their water?

Mr. Bentley: In one case they use the same water, and in another case they use the heat from the water.

D. J. Redding (P. & L. E.): In the system we have in use I will say that we can wash out a half dozen boilers at one time and have separate lines of pipe. There is one line of pipe for each purpose in the round house, but, in the final connection from the well to the locomotive boiler there is only one pipe. You can blow out the boiler, and without changing the connection, you can fill it again, or fill it with steam.

I think one of the greatest advantages to be derived from a system such as here described is the fact that you can get your engine out quickly, no matter what reason you may have for doing so, whether you wash your boilers once a week or once in many weeks, depending on the water, it is often necessary to take the fire out for other purposes. Where you have a system installed primarily to wash boilers, you can figure much closer and know no matter what work you have to do on the boiler, you can get it done within 30 minutes of the time the engine is required, and can get your engine heated up in good season. If you use cold water you have to allow more time.

H. E. Passmore (T. & O. C.): As I understand the system, the two tanks have also in connection with them two pumps, one being used for washing out purposes and the other for filling purposes, and there is a system of pipes and valves which make it convenient to blow out and wash out and fill any number of engines, according to the size of the tank. You can put in a tank large enough to take care of one or half a dozen pits. It is just a detail of the piping.

J. H. Manning (D. & H.): On the railroads with which I am now connected, washing out boilers is not as important as it was on the Union Pacific. We do not have to do it quite as often, and we would not do it as often as we now do, were it not for the fact that the New York Railroad Public Service commission insist on our doing it. We have no hot water arrangement for washing out our boilers.

H. H. Vaughan (Can. Pac.): No doubt when we were putting water in through the injectors, we were doing about the worst possible thing that could be done to cool off the boiler, cooling it off at the bottom and leaving it hot at the top. Have you investigated, in your work on this committee, whether it is customary, after blowing out the water, which takes about twenty minutes, and cutting out plugs, to put this water at a temperature of 140 degrees, right into the boiler? We did that. We have two or three washing out plants, and it takes about 40 minutes from the time we start until the plugs are out. We put in hot water, and there is steam over the boiler wherever the hot water strikes, if we use water at a temperature of 140 degrees. I think the temperature of the sheets and flues is 350 degrees at the time the blow off is completed. When we start washing out there is a portion of steam wherever the water strikes. We have had no trouble with that, and I would like to know if we are using the system the same as everybody else. It is possible that a series of small local contractions do less harm than a heavy contraction caused by a mass of cold water at the bottom, and hot water at the top, which strains the boilers.

Our washing out plants are simple—we simply use one tank, which in some cases we have connected so as to use with the feed water heater for the round house boilers, and makes an economical arrangement, and the washing out is not by any means the only advantage of this thing. Time after time one may desire to blow down a boiler and fill it up quickly, and the washing out system, with its separate blow off line leading out of the round house, and the filling up line, is splendid.

We have a system in which we use three lines, one hot water line, a cold water line, and a blow off line. We combined the hot and cold water at a union box to get the different temperatures, or when we want to blow off and have the hot water to use for filling up. That is a great convenience, and we would like to have it at all our terminals, although it is quite an expensive installation, comparatively speaking. I am very much interested in knowing about this washing out with hot water; whether it is possible to put hot water into the jacket the moment the water is blown out, without cracking the sheets.

J. J. Ellis (C. St. P. M. & O.): We have a system by which we blow off the boilers, and have a washing out system in which we use as hot water as we can get. We give the boilers 20 minutes to cool before we begin to wash out, and we have very few cracked sheets. By doing it that way, I think everything would be all right. I do not believe in blowing a boiler out and washing it right away. I believe we should give it a reasonable time to cool off so that it will be of a uniform temperature all through.

A. Lovell: In reference to Mr. Vaughan's inquiry as to how other people were using the hot water washing out arrangement. About a year ago I was instrumental in the establishment of a plant of this kind at a place where some of the largest Decapod engines, with trailing wheels, were used. After blowing off the steam, we kept the crown sheet covered with hot water and introduced cold water through the check valve, until the water was virtually cooled down to about 90 or 100 degrees, before withdrawing the water and washing out.

My instructions were after installing the new tank to continue this practice of cooling down the boilers until there was no more difference between the original temperature and the washing out temperature than there was originally in the cold water method. We found in doing this that there was not very much saving in time by the hot water method. The difference in cooling down from 350 degrees to 110, or 120 degrees, which is about as hot as you can wash out, is not very different from cooling down from 350 degrees to 60 or 70 degrees, so that the time actually saved in washing out by that method was not very great.

We then adopted the method, of which Mr. Vaughan speaks, of drawing off the water, and immediately washing out with hot water, as hot as the workmen could hold the hose, about 130 degrees. That method has worked satisfactorily, and as far as I know, there has never been a cracked sheet. This was contrary to my ideas of what ought to be done, but was adopted as a standard to get the best results possible in the hot water washing out system. This system was so arranged that the steam was blown off through brass tubes, into receiving tanks, which heated the water for filling up the boilers. Any surplus steam went to a settling tank underground from which the water from the boiler was run out through an underground pipe, after the steam had been blown off. The steam was blown off through these steam tanks first, and the water drawn off through the pits, and run into the settling tank underground. The washing out water was pumped out of the second tank back to wash out the boilers, and that was found to be as hot as the workmen could use it, and it was necessary at times to use cold water with it. After the boiler was washed, the water was taken from the heating tanks, through which the steam had passed, and the boiler was filled up with that.

I think by the old method of washing out, it took from 7 to 10 hours, to cool the boiler down, wash it, fire it up, and get steam enough to get it out of the round house. Under the new arrangement, I think it takes 2 hours and 50 minutes to do the same work, possibly 3 hours.

G. W. Wildin (N. Y. N. H. & H.): We have to wash out the boilers only once every 30 days, when we have to test the stay bolts to comply with the law. I would like to inquire of those who have spoken of introducing water at 140 degrees into the boiler, during a test of stay bolts, how they handled the matter. It would not be necessary for us to wash out the boilers even once in three months, if we did not have to watch the stay bolts. The advantages of the hot water system do not appeal to me as completely as they seem to appeal to others.

Mr. Lovell: The plant I have reference to was located where the boilers required washing every round trip.

T. H. Curtis (L. & N.): I think there can be no doubt about the advantages of a hot water washing out system. It is also my opinion that locomotive boilers should not be cooled

any faster than you can cool the water in the boiler. It is my opinion that to put hot water on to a hot boiler, as Mr. Vaughan spoke of, is wrong. You must let the water go down in the boiler and what mud is in the boiler should be allowed to settle. If you do not do this, the heat in the metal will bake this mud on the boiler and make it harder to wash out.

To obviate this, you should have the plugs so located and such a set of blow off cocks that you can start the water running out of the bottom of the boiler, and commence to wash out about the time the water recedes to the height of the top of the crown sheet, and commence to wash right on the hot water, and in that way you will find the mud is very thin and easy to remove, and as the water recedes in the boiler, keep washing down in the boiler, and you will find you can get a great deal more of the mud out of the boiler.

I wish to state facts, and not opinions. On the Louisville & Nashville, between Mobile and New Orleans, there is such brackish water that it is necessary to wash out the boilers every round trip, about every 280 miles, and change the water in between. We applied a system, involving the use of blow outs, with about seven valves on the boiler, and the introduction of oil. We have found it possible to run these engines from 6,000 to 7,000 miles between washouts. This water does not contain mud. On the other, we have between Louisville and Cincinnati, water that comes from the rivers and clay banks, and that is full of clay, and the boilers require washing out every 220 miles. We applied the blow off system and introduction of oil, to which I have just referred, and were able to increase the mileage of these locomotives from 4,500 miles to 6,000 miles per month. The system obviates the necessity of washing out the boilers to a large extent.

R. C. P. Sanderson (Virginian): There is no question as to the benefit of using hot water for washing, as hot as the men can stand handling the hose pipe, and still less question about using hot water to fill up with, but I entirely agree with Mr. Curtis in what he said about cooling the boiler. The great American hurry-up process is bound to get us into trouble if we do not look out.

It may be wrong, and possibly cause trouble to turn cold water into the boiler in such a way that the boiler is strained by unequal expansion and contraction, but that can be overcome by making special provision for distributing the water. I believe it is all wrong to attempt to wash the boiler until you have the temperature of the metal sheets down to such a point that the mud and slime will not burn on the sheets. You cannot wash it off if you do, and there are many places all over the boiler, especially the flue sheet, that you can never reach with a jet of water with any nozzle. I think we should guard against manufacturing scale.

Mr. Gaines: In reply to both Mr. Curtis and Mr. Sanderson and just to call attention briefly to a method I am using for cooling which seems to give very good results, I will say that, after steam has been blown down to atmosphere pressure, I take a stream of cold water and put it into the boiler, through the plugs and blocking at the same time the back head washout plugs located about four inches above the crown sheet. The cold water naturally settles to the bottom and gradually rises. I keep that process going until the cold water comes out of the washout plugs above the crown sheet. When the temperature gets down so that a man can put his hand in, say 100 degrees or lower, we consider it safe to go ahead and empty it out.

Mr. Curtis: I have been surprised to find in washing out with this method of cooling the boiler down with water that if you will be very careful to notice that the crown sheet is black when the water is white, but if you allow the water to recede before you wash the crown sheet it will be all gray or muddy colored, showing that the baking process has had an effect.

Mr. Henderson: I would like to ask Mr. Bentley one more question. That is, whether the water when it was let out was blown out with steam pressure, or the pressure let off the engine first?

Mr. Bentley: I think the point Mr. Vaughan brought up is very essential to consider. There is no question but that the temperature of the boiler is very much higher than the temperature of the water used for washing out. But I have known of places, not on our road, fortunately, where the boiler was at the same temperature as it would be when the steam was just blown off, and people have actually put cold water in, and damage has been done. A temperature of 140 degrees for washout water is so much better than cold water, 40 or 50 degrees, that I am heartily in favor of anything that is an improvement over those methods.

Mr. Wildin speaks about not having to wash out. We are not so fortunate as Mr. Wildin. It frequently happens that we have to wash out once a week and change the water twice in that same time, in some of our bad water territory. If I were Mr. Wildin I would find out from the New York inspectors whether they would not be satisfied with an inspection hole in a stay bolt so he would not have to let the steam and water out, but could inspect your stay bolts from the outside.

Mr. Curtis brings out certain points that are foreign to the committee's report. The committee was appointed to investigate the best system of hot water washing out and not how to prevent the necessity of washing out. I believe Mr. Curtis is all right in trying to do away with the washing out of boilers, and I would like to see it done if possible.

I do not know positively whether hot or cold water has the better result on the removal of scale, but on some parts of our road up in Dakota, we have found that cold water would have no impression on the sediment that was left in the boiler, but hot water would cut and loosen it so that we could wash it out very readily.

Answering Mr. Henderson, the general method of handling is to blow the steam and water off at the same time, so as to reduce the time. It gets the water out very much quicker, and gets the engine ready for washing out more quickly than could be done if it was done separately.

I want to recommend to those unfortunate brothers who have to wash out once a month or so that they have large blow off cocks, and blow off connections so that they can get the steam and water out of the boilers very much quicker than we do now at some points.

The President: I wish to call your attention to an innovation that we are going to introduce here tomorrow morning. It has been somewhat difficult to get our men around on time, and all of those who are not here tomorrow morning at 10 o'clock will be exceedingly sorry, because there is going to be a photographer here to take a picture at that time, and if you do not report we will know all about it. So do not forget. Our meeting will open, of course, at 9:30 tomorrow morning, as usual, and in order to be sure about that picture, get here promptly.

Adjourned.

JOURNALS ON STANDARD AXLES.

The topical discussion of the Master Car Builders' Association on the question: "Should journals of standard axles when fillets are partially worn, be made longer in order to get in a full size fillet? If so, what should be the limit of the length of journals?" on Friday was opened by W. E. Fowler (Can. Pac.) as follows:

There are very few iron axles put under modern freight cars. The axle of today is that made of open hearth steel, a material which does not give good service in carrying heavy loads, or in sustaining severe shocks if its outline be disposed into sharp corners or angles, and the designers of the M. C. B. standard axles accordingly have provided, that, where there is a step or change of diameter, there should be a fillet or curved graduated connection between the larger and smaller diameters, since if a sharp corner or right angle be allowed, a fracture is invited at that point, and a great loss of property will probably ensue.

The lengthening of journals of axles in order to replace worn fillets is a practice which is more or less followed on all railroads, but so far as my knowledge extends, there are no generally observed limits to this extension of length. In my opinion an axle with the journal fillet entirely worn out should, when withdrawn for changing wheels, be scraped. The reformation of the entire fillet with the consequent lengthening of the journal, is an unsafe practice, as when the fillet is quite worn out there is, in all probability, an incipient crack where the fillet formerly was, and it is only inviting trouble to return such axles to service.

Considering the disastrous results that follow a broken journal, I think "an ounce of prevention is worth a pound of cure" in this as in many other cases, and the prevention consists in scrapping all axles with worn out fillets.

There are however many axles drawn from service on account of wheel failures that have fillets partially worn, and which may in the opinion of many be made fit for long further service by putting them in the lathe and lengthening back the dust guard shoulder and so renew the fillet, so essential to the load carrying ability of the journal.

I think it will be agreed generally that excessive lateral movement of the journal bearing on the journal, (which of course means also movement of the superimposed load,) is not desirable, in fact, that it is injurious to wheels, axle, and truck, car body and track, and in view of the heavy load now carried, the speed attained and the consequent stresses on the wheel flange, we should make our wear limits less and our inspection more rigid, to preserve the same factor of safety with the heavy capacity car and the high speed that we formerly had with the light car and low speed.

We have limits of diameter for journals, wheel seats and

axle centers, we have limits for thickness of collars, and we should have limits for length of standard journals, for the reasons enumerated, as also to keep within reasonable limits the lateral movement of journal bearings (and consequently the truck frame) on the journals.

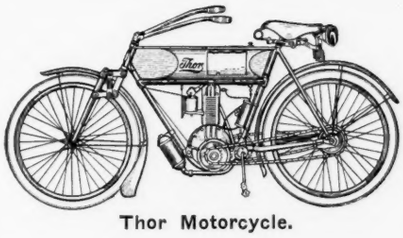
In view of my opinion that only partially worn fillets should be reformed by lengthening the journal, I think that a length limit of 7½ inches should set for 7-inch journals, 8½ inches for 8-inch journals, and 9½ inches for 9-inch journals, and 10½ inches for 10-inch journals.

J. J. Hennessey (C. M. & St. P.): I think this is almost too important a subject to pass. I agree fully with Mr. Fowler that it is a dangerous practice to attempt to turn in a fillet in an axle after it has been once worn out. We allow as much lateral motion on the axle when new, as we consider advisable. When it is attempted to give additional lateral motion, there is risk of a broken journal. That is not the only risk. Also as with the standard, our journal boxes at present are running close to the hub of the wheel, to save the journal is very often to destroy the oil boxes.

Wm. Forsyth (Railroad Age Gazette): I move that this subject of the limit of length of journals be referred to the committee on "Standards." (The motion was seconded by W. E. Fowler and carried.)

THOR MOTORCYCLE.

One exhibit of no small attraction is that of the Thor Motorcycle at the booth of the Independent Pneumatic Tool Company. This motorcycle is exhibited by the Aurora Automatic Machinery Company, a subsidiary company of the Independent Pneumatic Tool Company. The motorcycle has the same trade mark as the tools of the Independent Company. The Thor motorcycle is the latest and most improved motorcycle on the market. The motor, instead of driving direct from the fly wheel shaft has a planetary geared transmission, enclosed in a dust proof and oil proof gear case which is a part of the motor base itself. The motor is anti-friction bearing, and the planetary gear is ball-bearing. This reduces friction about seventy per cent, and makes the motor extremely efficient. This machine would prove valuable to contractors, collectors, railroad call service, superintendents, etc., and a time and money-saving conveyance to all mechanics who are compelled to travel considerable distance to and from work.



Thor Motorcycle.

THE SIMPLEX COUPLER.

The Simplex coupler exhibited by the American Steel Foundries is attracting favorable comment. It is claimed that this coupler complies with all M. C. B. recommendations and standards and also embodies the following advantages:

Large locking surface (5½ square inches) on the knuckle, coupler wall and lock; short lift required to operate. A 2-inch lift will uncouple, and a 3¾-inch lift will throw the knuckle open to the extreme limit; the knuckle opens in line with the coupler ear, giving the greatest possible opening, so that it is not necessary to open the knuckles of both couplers in coupling; section of metal forward of lock hole through the face of coupler 1¼ in. thick at the throat, 1½ in. thick at the top; positively throws the knuckle wide open from any position; lock-set acts positively for any position in which coupler may stand; lock can also be dropped from the lock-set position to the locked position by means of uncoupling lever; anti-creeping device prevents accidental uncoupling through creeping of the lock; uncouples automatically in case draft gear pulls out; adapted to side uncoupling; applicable to passenger equipment, knuckles and locks interchangeable for freight and passenger couplers. Does not require special chain or parts in attaching to uncoupling lever; takes the standard M. C. B. link and clevis.

WESTINGHOUSE MOTORS AMONG THE EXHIBITS.

A number of the operating exhibits on the convention pier show interesting applications of Westinghouse apparatus, including:

Safety Car Heating and Lighting Company, one set of 32 cells type 13-R-32 Westinghouse storage batteries;

Bliss Electric Car Lighting Company, Tungsten lamps for car lighting service;

Yale & Towne Manufacturing Company, two 1-ton trolley hoists operated by ⅞-hp. Westinghouse type R motor;

Celfor Tool Company, 17-hp. S. A. motor, 300 to 1,200 r. p. m., operating Baker Bros. high-speed drill;

T. C. Dill Machine Company, 5-hp. S. A. motor, operating 15-inch Dill slotter; 4-hp. S. motor, operating Dill variable speed drive;

Wm. Sellers & Co., 5-hp. S. motor, driving No. 1 universal tool grinder; 6-hp. S. motor driving No. 2 tool grinder; 2-hp. S. motor driving drill grinder;

American Blower Company, 7 kw. 200-volt generator, direct-connected to 5 by 5 A. B. C. engine; 10-hp. S. motor belted to No. 5 A. B. C. fan; ¾-hp. S. motor direct-connected to exhaust fan.

The Barnett Equipment Company of America is making an interesting display of locomotives and cars of the old time in the form of pictures in its booth. Among them is the original drawing of the locomotive Essex built in Newark, N. J., in 1838. The DeWitt Clinton train, Mohawk & Hudson Railroad, 1830, and the locomotive "Sandusky," built in Paterson, N. J., in 1836. From these originals the series contains many types up to the present, including both American and European machines. It is not surprising that one of the recent examples is the end view of a Central Railroad of New Jersey locomotive equipped with the Barnett connector. This is a head casting with passages for signal, brake and steam lines. The ports are brought to register by means of pin and funnel guides. This flexibly suspended device connects irrespective of the vertical or lateral differences of the cars.

The Falls Hollow Staybolt Company of Cuyahoga Falls, Ohio, received yesterday a large order for hollow bars from the Payta & Peru Railroad, of Peru, South America.

The Consolidated Railway Electric Lighting and Equipment Company is showing a new feature in connection with its exhibit that is exciting great interest, especially among the railroad men who are interested in electric lighting of railway cars. This is an attachment to the Kennedy regulator, making a complete automatic system for each car. In addition to furnishing a constant charging current to the battery, and a constant potential on the lamp circuits, it prevents an overcharge or an overdischarge of the battery, and provides for greater flexibility of the system than has been practicable heretofore. It is said that a car may be transferred from the heaviest service to the lightest without the necessity of readjusting the regulator, as the regulator automatically adjusts itself to the changed conditions. Another feature is an index or gauge by which one may see at a glance the state of the charge in the battery when the car is standing. In connection with this there is a monthly recording device which automatically produces a history of the lighting system during that period.

This exhibit is at Booth 435-437 on the convention pier.

When the versatile Vesella isn't playing—
Isn't playing—
And his tooters are not tooting flageolets;
When his brazen oom-pah tubas are not braying—
Are not braying—
That's the only chance the hot-air spieler gets.

ROLL CALL—MASTER MECHANICS.

Adams, A. C., M. M., C. B. & Q., Dennis.
Aldcorn, Thos., Chi. Pneumatic Tool Co., Marlborough.
Allen, C. W., Pennhurst.
Allen, G. S., M. M., Phila. & Reading, Pennhurst.
Allison, W. L., Mech. Eng., Sante Fe, Marlborough-Blenheim.
Amann, W. E., Galena-Signal Oil Co., Chalfonte.
Appler, A. B., M. E., Delaware & Hudson Co., Dennis.
Arp, W. C., S. M. P., Vandalia, Marlborough-Blenheim.
Atkinson, R., M. M., Phila. & Reading, Fredonia.
Ayers, A. R., Supt. Shops, L. S. & M. S., Marlborough.
Barton, P. F., M. M., Ill. Central, Haddon Hall.
Basford, C. M., Amer. Loco. Co., Marlborough-Blenheim.
Bechhold, H. C., Cleve. Frog & Crossing Co., Marlborough-Blenheim.
Bell, J. Snowden, Berkshire Inn.
Bentley, H. T., A. S. M. P. & M., C. & N. W., Chalfonte.
Bingaman, Chas. A., Eng. Tests., P. & R., Monticello.
Bissett, J. R., M. M., Seaport Air Line, Galen Hall.
Boldridge, R. M., M. M., Miss. Central, Islesworth.
Booth, J. S., M. M., Carolina & N. W., St. James Place.
Bowles, C. K., M. M., Tidewater & Western, Monticello.
Bradeen, J. O., M. M., N. Y. Central, Windsor.
Brangs, Geo. E., Brighton.
Brazier, F. W., S. R. S., N. Y. Cent. & Hud Riv, Marlborough.
Brown, H. B., M. M., Erie, Borton.
Buchanan, A., Jr., Public Service Commis., Haddon Hall.
Bushmeyer, C. P., M. M., Okla. Central, Iroquois.
Bussing, G. H., S. M. P., E. & T. H. R. R., Haddon Hall.
Caracristi, V. Z., Am. Loco. Co., Traymore.
Carroll, J. T., A. S. M., Lake Shore & Mich. Southern, Marlborough-Blenheim.
Chase, F. A., C. M. I., C. B. & Q., Marlborough-Blenheim.
Casey, F. A., Marlborough-Blenheim.
Cassidy, D. E., M. M., Pennsylvania, Mervine.
Chamberlin, E., N. Y. C. & H. R. R. R., Marlborough-Blenheim.
Chambers, C. E., M. M., Central R. R. of N. J., Dennis.
Chambers, John S., S. M. P., Atlantic Coast Line, Marlborough-Blenheim.
Chester, W. E., Traymore.
Chidley, Jos., Lake Shore & Mich. So., Marlborough-Blenheim.
Christopher, J., M. M., Toronto, Hamilton & Buffalo, Worthington.
Chrysler, W. P., S. M. P., Chicago Gt. Western, Haddon Hall.
Clark, J. H., M. M., Staten Island R. T., Shelburne.
Clifford, J. G., Marlborough-Blenheim.
Cole, T. J., M. M., Erie, Dennis.
Conners, J. J., M. M., C. M. & St. P., Rudolf.
Conolly, J. J., S. M. P., Dul. So. Shore & Atlantic, Young's.
Cook, John S., M. M., Georgia, Marlborough-Blenheim.
Cook, T. R., A. E. M. P., Penn. Lines West, Dennis.
Cooper, F. R., S. M. P., K. C. So. Ry., Strand.
Cory, Chas. H., Dennis.
Coutant, M. R., M. M., Ulster & Dela., Shelburne.
Crawford, D. F., G. S. M. P., Pennsylvania, Brighton.
Cromwell, O. C., M. E., B. & O., Haddon Hall.
Cross, C. W., Supt. Apprentices, N. Y. C. Lines, Haddon Hall.
Cullian, John, M. M., Cent. Ind. Ry., Chetwoode.
Cumback, R. O., S. S., Central R. R. of N. J., Chalfonte.
Curry, Geo., G. S., Amer. Loco. Co., Traymore.
Curtis, Theo. H., S. M., L. & N., Marlborough-Blenheim.
Davis, Joseph, M. M., P. R. R., Marlborough-Blenheim.
Deeter, D. H., M. M., Phila. & Reading, Wellsborough.
Desmond, D. G., M. M., Morgantown & Kingwood, Chester Inn.
De Voy, J. F., M. E., C. M. & St. P., Shelburne.
Dickerson, S. K., A. S. M. P., L. S. & M. S., Marlborough.
Diehr, C. P., M. M., N. Y. Cent. & Hud. Riv., Monticello.
Divine, J. F., Atlantic Coast Line, Chalfonte.
Dolan, S. M., M. M., Missouri Pacific, Marlborough-Blenheim.
Dunn, A. J., M. M., Va. & Southwestern, Traymore.
Dunn, J. F., S. M. P., Oregon Short Line, Marlborough-Blenheim.
Edmondson, W. C., Mich. Eng., Phila. & Reading, Traymore.
Elden, Edw., M. M., N. Y. C. & H. R. R. R., Osborne.
Elliott, J. B., M. M., B. & O. R. R., Kenderton.
Ennis, W. C., Windsor.
Ettinger, R. L., C. M. E., Southern, Dennis.
Evans, R. C., S. M. P. & C. D., Western Maryland R. R., Monticello.
Ewing, J. J., M. E., Chesapeake & Ohio, Marlborough-Blenheim.
Fay, Robt. Chief Clerk, M. P. Dept., P. R. R., Marlborough-Blenheim.
Feeley, T. M., M. M., Iowa Central, Grand Atlantic.
Ferguson, L. B., M. M., Vicksburg, Shreveport & Pac., Monticello.
Fetner, W. H., M. M., Central of Georgia, Islesworth.
Fildes, Thos., Young's.
Flavin, J. T., M. M., Ind. Ill. & So., Marlborough-Blenheim.
Flory, B. P., M. E., Central of N. J., Marlborough-Blenheim.
Fogg, J. W., M. M., Chicago Terminal Transfer, Chalfonte.
Forsyth, Wm., M. E., The Railway Age, Dennis.
Foster, O. M., M. M., L. S. & M. S., Windsor.
Fowler, Geo. L., Dennis.
Franey, M. D., S. S., Lake Shore & Mich. So., Marlborough-Blenheim.
Fraps, J. C., M. M., Aberdeen & Ashboro, Loraine.
Fuller, C. E., A. S. M. P., Union Pacific, Marlborough-Blenheim.
Fulmer, J. H., M. M., Pennsylvania, Elberon.
Gaines, F. F., S. M. P., Cent. of Georgia, Dennis.
Gallagher, G. A., M. M., Illinois Southern, Haddon Hall.
Gauthier, Jesse, M. M., C. R. R. R., Elwood.
Gilbert, E. B., S. M. P., Bessemer & Lake Erie, St. Charles.
Gilbert, F. M., M. E., N. Y. C. & H. R. R., Seaside.
Gordon, H. D., Marlborough-Blenheim.
Goss, W. F. M., University of Ills., Haddon Hall.
Gould, J. E., S. M. P., Norfolk & Southern, Dennis.
Graham, Chas., Amer. Loco. Co., Osborne.
Gray, B. H., M. M., New Orleans Terminal, Traymore.
Gray, G. M., M. E., Bessemer & Lake Erie, St. Charles.
Green, H., M. E., So. Balto. Steel Car & Fdy. Co., Dennis.
Greenwood, B. E., G. F., Seaboard Air Line, Galen Hall.
Griffith, R., M. M., Colorado Midland.
Hair, John, S. M. P., B. & O., Dennis.
Hallin, J. J., M. M., Seaboard, Galen Hall.
Hammond, G. O., M. E., Erie, Young's.
Hancock, Geo. A., Genl. S. M. P., St. Louis & San Francisco, Marlborough-Blenheim.
Harrigan, P. J., M. M., B. & O., Chetwoode.
Harrington, H. H., M. M., Erie, Dennis.
Harris, C. M., M. M., Washington Terminal, Shelburne.
Harris, J. D., Westinghouse Air Brake Co., Shelburne.
Hartigan, B., G. F., Rutland, Arlington.
Haskell, B., Chalfonte.
Hawkins, B. H., M. M., Del. Lack. & Western, Jackson.
Hayes, C. W., M. M., Blue Ridge, Ry., Clarendon.
Henderson, G. R., Galen Hall.
Hess, G. F., M. M., B. & O. R. R., Young's.
Hibbits, F. N., S. M. P., L. V. R. R., Dennis.
Hicks, I. C., M. M., Santa Fe Lines.
Hildreth, F. F., M. M., Vandalia, Dennis.
Hill, John, M. M., Lake Erie & Western, Dennis.
Hill, John A., Chalfonte.
Hill, Rufus, M. M., Pennsylvania, Archdale.
Hinckley, A. C., M. M., C. H. & Dayton, Traymore.
Hodgins, Geo., Bothwell.
Hoffmaster, F. S., M. M., N. Y. & N. R. R., Raymond.
Hogan, C. H., D. S. M. P., N. Y. C. & H. R. R., Marlborough-Blenheim.
Holtz, David, Runnymeade.
Howard, John, S. M. P., N. Y. Cent. Lines, Marlborough Blenheim.
Hunter, H. S., M. M., Phila. & Reading, Norwood.
Hyndman, F. T., Marlborough-Blenheim.
James, Chas., M. M., Erie, Dennis.
Johnson, W. O., M. M., Emp. Shops, Canal Zone, Rudolf.
Joughins, G. R., M. S., Intercolonial, Chalfonte.
Kalbaugh, I. N., Coal & Coke Co., St. Charles.
Kapp, W. F., S. S. & M., Rich. Fred. & Potomac, Marlborough-Blenheim.
Kastlin, Jacob, Supt. Davenport Loco. Wks., Traymore.
Keegan, Jas. E., S. M. P., Grand Rapids & Indiana, Shelburne.
Kehoe, R. H., M. M., Norfolk & Southern, Dennis.
Kellog, W. L., M. M., Pere Marquette, Traymore.
Kells, Williard, M. M., Lehigh Valley, Marlborough-Blenheim.
Kendig, R. B., M. E., L. S. & M. S., Marlborough-Blenheim.
Kilpatrick, J. B., A. S. M. P., R. I. & Pacific, Marlborough-Blenheim.
Kilpatrick, R. F., Marlborough-Blenheim.
Kinney, W. H., M. M., N. Y. Ontario & Western, Traymore.
Kirkpatrick, Jas., M. M., B. & O., Elberon.
Kneass, Strickland L., Wm. Sellers Co. Ltd., Marlborough-Blenheim.
Knight, Wm. Edw., S. M. P. & S., Cuba R. R.
Kurman, A. G., M. M., Mt Jewett, K. & R. R. R., Delaney.
Kyle, C., M. M., Canadian Pacific, Rudolf.
Lane, F. W., Dennis.
Lape, C. F., Shelburne.
Leach, H. L., Gold Car Heating Co., Marlborough-Blenheim.
Leach, W. B., Marlborough-Blenheim.
Lewis, W. H., S. M. P., Norfolk & Western, Marlborough.
Lovell, Alfred, Winthrop.
Luscombe, J. T., M. M., T. & O. C. Ry., Young's.
MacBain, D. R., A. S. M. P., New York Central, Traymore.

McGee, G. S., S. M. P., M. & O., Dennis.
McGee, W. J., M. M., Tampa Northern, Traymore.
McGill, A M., M. M., Lehigh Valley, Traymore.
McHaffie, A. B., M. M., Intercolonial, Rudolf.
McHattie, T., M. M., Grand Trunk, Traymore.
McIntosh, Wm., S. M. P., Central R. R. of N. J., Marlborough-Blenheim.
McLean, W. J., M. M., Bell. Bay & Brit. Col., Dennis.
McNaughton, Jas., Amer. Loco. Co., Marlborough-Blenheim.
McNulty, F. M., M. M., Monongahela Conn., Chalfonte.
McRae, J. A., M. E., Michigan Cent., Chalfonte.
Magarvey, J. R., Mgr. American Loco. Co., Traymore.
Maher, P., S. M. P., Chicago & Alton Ry., Marlborough-Blenheim.
Malthaner, W., M. M., Delaware & Hudson, Traymore.
Manchester, A. E., S. M. P., C. M. & St. P., Traymore.
Manchester, H. C., M. M., Maine Central, Marlborough-Blenheim.
Manning, J. H., S. M., Delaware & Hudson, Marlborough-Blenheim.
Mechling, J. E., M. M., Vandalia, Dennis.
Meister, C. L., M. E., Atlantic Coast Line, Marlborough-Blenheim.
Mellin, C. J., Amer. Loco. Co., Traymore.
Mendenhall, C. M., Brighton.
Menzel, W. G., S. M.P., Wisc. Cent., St. Charles.
Meredith, H. P., A. E. M. P., Penn. R. R., Marlborough-Blenheim.
Miller, E. A., S. M. P., N. Y. C. & H. R. R. R., Shelburne.
Miller, J. B., G. F., St. L. Southwestern of Texas.
Miller, S. W., Amer. Loco. Co., Traymore.
Minshull, P. H., M. M., N. Y. O. & W., Traymore.
Mitchell, A. E., N. Y. N. H. & H., Chalfonte.
Moan, E. G., G. F., Atlantic Coast Line R. R., Bellevue.
Moir, Wm, C. M. M., Northern Pacific, Chalfonte.
Monkhouse, H., Rome Loco. & Mach. Wks., Chalfonte.
Montgomery, Hugh, C. F., Cent. R. R. of N. J., Dennis.
Montgomery, Wm., M. M., Cent. of N. J.
Moriarty, G. A., M. M., Erie, Haddon Hall.
Morris, W. S., Ft. Wayne, Ind., Shelburne.
Muhlfeld, J. E., G. S. M. P., B. & O., Chalfonte.
Mullenix, S. W., S. M. Pur., C. R. I. & P., Young's.
Murrian, W. S., M. M., Southern, Haddon Hall.
New, W. E., M. M., K. C. Belt Ry., Monticello.
Neward, F. H., M. M., Pontiac Ox. & Northern, Chalfonte.
Newhouse, J. F., M. M., Ken. & Ind. Bridge & R. R., Marlborough-Blenheim.
Nicholson, John, S. M. P. & M., St. L. B. & M. R. R., Marlborough-Blenheim.
Nieltopp, R., Foreman Car Shops, P. R. R.
Ord, C. R., M. M., Canadian Pacific, Wiltshire.
Oviatt, H. C., M. M., N. Y. N. H. & H., Chalfonte.
Owens, W. H., M. M., Southern, Dennis.
Parish, LeGrand, S. M. P., L. S. & M. S., Marlborough-Blenheim.
Park, S. T., S. M. P., C. & E. I., Marlborough-Blenheim.
Parks, Geo. E., M. M., Mich. Cent., Marlborough-Blenheim.
Passmore, H. E., M. M., Toledo & Ohio Central, Young's.
Patterson, J. S., Marlborough-Blenheim.
Paxton, Thos., S. M. P., El Paso & So. Western, New England.
Pearce, J. S., M. M., Norfolk & Western, Dennis.
Pearsall, D. M., M. M., Atlantic Coast Line, Windsor.
Peck, Peter H., M. M., C. & W. I., Marlborough-Blenheim.
Peyton, H. T., M. M., A. T. & S. F., Marlborough-Blenheim.
Pflager, H. M., Commonwealth Steel Co., Marlborough-Blenheim.
Phillips, C., M. M., New O. & Northeastern, Brighton.
Pilcher, J. A., M. E., Norfolk & Western, Traymore.
Platt, J. G., Dennis.
Pomeroy, L. R., Safety Car Heating & Lighting Co., Dennis.
Powers, M. J., M. M., Dela. & Hudson, Arlington.
Pratt, E. W., M. M., Chi. & N. W., Marlborough-Blenheim.
Prendergast, A. P., M. M., B. & O., Shelburne.
Prendergast, J. F., M. M., B. & O., St. Charles.
Preston, Robt., M. M., Canadian Pacific, Rudolf.
Quereau, C. H., S. E. E., N. Y. C. & H. R. R. R., Haddon Hall.
Redding, D. J., M. M., Pittburg & Lake Erie, Marlborough-Blenheim.
Reid, W. L., Amer. Loco. Co., Marlborough-Blenheim.
Rettew, C. E., D. & H. Co., Fredonia.
Reynolds, O. H., Bethlehem Steel Co., Islesworth.
Rhodes, L. B., M. M., Ga. Southern & Florida, Chalfonte.
Richmond, W. H., M. M., Lake Superior & Ishpeming, Young's.
Rieckman, W. H., A. M. M., Boston & Maine, Marlborough-Blenheim.
Riley, Geo. N., M. M., McKeesport Connecting, Marlborough-Blenheim.
Rink, Geo. W., Chief Draughtsman, C. R. R. of N. J., Pennhurst.
Robinson, Frank, Robinson Co., Rudolf.
Rogers, R. H., M. M., N. Y. N. H. & H.
Roope, Thos., S. M. P., C. B. & Q., Marlborough-Blenheim.
Rosing, W. H. V., M. E., Mo. Pacific, Chalfonte.
Rumney, T., M. S., Erie, Young's.
Russell, W. B., Asst. Supt. Apprentices, N. Y. C. Lines, Shelburne.
Ryan, J. J., S. M. P., Southern Pacific, Young's.
Sanderson, R. P. C., S. M. P., Virginian Ry., Marlborough-Blenheim.
Scheffer, F. H., S. M. P., Nashville Chatt. & St. L., Runnymede.
Schlatge, Wm., M. Mech. Supt., Erie, Young's.
Seabrook, C. H., Gen. M. M., Trinity & Brazos V. Ry., Chalfonte.
Seddon, C. W., S. M. P., Dul. Missable & Northern, Chalfonte.
Sedgwick, E. V., Young's.
Seidell, G. W., Supt. Shops, C. R. I. & P., Marlborough-Blenheim.
Seley, C. A., M. E., C. R. I. & P., Chalfonte.
Setchel, J. H., Cuba, N. Y., Dennis.
Shea, R. T., Insp. Tools & Machy., N. Y. C. Lines, Marlborough-Blenheim.
Shepard, L. A., Atha Steel Casting Co., Brighton.
Shoemaker, H., M. M., Del. Lack. & Western, Traymore.
Sinclair, Angus, Traymore.
Sinnott, W., M. M., B. & O.
Small, J. W., S. M. P., G. V. G. & N. Ry., Marlborough-Blenheim.
Smethust, T., S. M. P & R. S., Interoceanic Ry., 107. N. Brighton Ave.
Smith, C. B., M. E., Boston & Maine, 17 So. Ind. Ave.
Smith, E. J., M. M., Atlantic Coast Line, Windsor.
Smith, F. C., Amer. Loco. Co., Scranton, Traymore.
Smith, Wm., Lyman Mfg. Co., Shelburne.
Smith, W. T., M. M., Chesa. & Ohio, Marlborough-Blenheim.
Sproul, N. E., M. M., Atlantic Coast Line, Young's.
Squire, W. C., Consult. Eng., Brighton.
Stewart, A., M. S., Southern, Haddon Hall.
Stewart, A. F., M. M., Chesa. & Ohio, Traymore.
Stewart, C. J., M. M., Cent. New Eng., Dennis.
Stewart, T. R., M. M., B. & O., Chetwoode.
Stocks, W. H., Chalfonte.
Stuart, C. M., M. M., Phila. & Reading, 166 So. Penna. Ave.
Stulb, W. H., M. M., C. of Ga. Ry., Islesworth.
Symington, T. H., Brighton.
Taylor, C. M., S. M. P., C. R. I. & P., Dennis.
Thomas, F. W., Supervisor of App., A. T. & S. F., Marlborough-Blenheim.
Thomas, H. T., M. M., Detroit & Mackinac, Young's.
Thomas, J. G., M. M., Cent. R. R. of N. J., Sothern.
Thomas, J. J., Jr., M. M., Atlantic Coast Line, Islesworth.
Thomas, W. H., Dennis.
Thompson, E. B., Asst. S. M. P., C. & N. W. Ry., Chalfonte.
Tollerton, W. J., A. C. S. M. P., C. R. I. & P., Marlborough-Blenheim.
Tracy, W. L., M. M., L. & N., Shelburne.
Tuma, Frank, M. M., Erie, Dennis.
Turnbull, A. G., A. M. S., Erie, Young's.
Turner, J. S., Pressed Steel Car Co., Marlborough-Blenheim.
Van Doren, G. L., S. S., Cent. R. R. of N. J.
Van Ripper, D. F., M. M., Erie, Dennis.
Vauclain, Samuel M., Baldwin Loco. Wks., Brighton.
Wagstaff, Geo., S. B., N. Y. Cent. Lines, Marlborough-Blenheim.
Wahlen, John, M. M., Montpelier & Wells River, Wellsborough.
Wall, G. L., M. E., Lima Loco. & Mach Co., Rudolf.
Walsh, F. O., M. M., A. & W. P., Marlborough-Blenheim.
Walsh, J. F., S. M. P., Chesa. & O., Marlborough-Blenheim.
Walton, E. A., S. M. P., N. Y. C. & H. R. R. R., Monticello.
Watson R. B., Engr. Tests, Erie R. R., Monticello.
Watts, Amos H., M. M., Cin. Northern, Dennis.
Weisgerber, E. L., M. M., B. & O., Young's.
West, G. W., S. M. P., N. Y. O. & W., Haddon Hall.
White, A. M., Amer. Loco. Co., Traymore.
White, E. T., S. M. P., B. & O., Haddon Hall.
White, J. E., M. M., L. & N. R. R., Shelburne.
Wickhorst, M. H., M. M., Manistee & N. E., Traymore.
Wildin, G W., M. S., N. Y. N. H. & H., Chalfonte.
Williams, F. W., S. M. P., C. R. R. I. & P., Windsor.
Wilson, D. H., Elec. Engr., Erie.
Wirt, G. M., M. M., C. C. C. & St. L., Dunlop.
Witherspoon, David, G. F., Cent. R. R. of N. J., Chester Inn.
Wright, R. V., Amer. Engineer, Young's.
Wyman, R. L., M. M., Lehigh & New Eng., Edison.
Yeager, Thos., M. M., Ill. Southern Ry., Monticello.
Young, C. B., M. E., C. B. & Q., Marlborough-Blenheim.
Young, C. D., A. E. M. P., Penn. Lines West., Young's.
Zang, P. C., M. M., N. Y., N. H. & H., Edgewater.

BEST SYSTEM OF WASHING OUT AND REFILLING LOCOMOTIVE BOILERS.*

The wording of the subject assigned to this committee asked particularly for data pertaining to benefits in the way of reducing defects in firebox sheets, staybolts and tubes, but as this is only a small part of the many benefits derived from washing out with hot water, we have felt at liberty to go into the matter more fully in other directions, as the actual data obtainable about reduction in staybolt breakages, leaking fireboxes and flues, from the use of hot water, was very meager.

The best system of washing out is one that will do the work properly, with the least change in temperature in boiler, at a minimum expenditure of heat, and in the shortest possible time.

To say which system is the best for obtaining these results is not within the province of this committee, but as there are several on the market which will do what is required of them, and each of them, so far as we can find out, is giving satisfaction, no particular make will be mentioned.

The fact that good results are obtained by having less trouble from firebox and flue leakage, and a reduction in the number of staybolt breakages, and last, but not least, the reduction in terminal delays, would appear to warrant the expense of installation.

The more nearly uniform the temperature is kept, the less expansion and contraction takes place, especially in the firebox, which must reduce the vibration in staybolts and give them a correspondingly increased life.

It has been demonstrated beyond a doubt that when a boiler is kept at a uniform temperature, the least trouble is experienced in the matter of leaking flues and fireboxes.

Under good water and coal conditions, fires are seldom dumped and leaks are almost unknown. Most of this, of course, is due to the water, but most of us have known of engines that have given trouble on account of leaking every day; when placed in the hands of certain engineers, would run day in and day out for a long time and be absolutely dry, the secret of the man's success being in the uniform temperature maintained, by insisting on careful firing, proper handling of dampers, and a scientific use of the injector. If such a condition can be obtained, and we know it is possible, it speaks volumes for maintaining the same temperature as far as possible in firebox and boiler; yet, how many are there of us who, when an engine is coming in from a run, will stand by and see all sorts of things done that, in our thinking moments, we know to be absolutely wrong. We apply cold water through the injector, while no circulation is taking place in boiler, we then blow the steam off by letting it escape to the atmosphere, after which the blow-off cock is opened, and a boilerful of hot water runs down the sewer; and then, as if not satisfied with wasting such a large amount of heat that we will have to replace later on at a cost of probably 800 to 1,000 pounds of coal, we turn on a stream of cold water and go through the washing-out process, so that the firebox is at a temperature of 45 to 50 degrees, and the top of boiler and some of the upper flues are still hot. Then is the time that some boilermakers get their work in; and we are surprised to have someone tell us that a report like a cannon was heard in the firebox and a crack developed in side sheet that has put our engine out of commission for a time, or if we are fortunate enough to miss the cracked side sheet, we fill our boiler up with cold water and reverse the process that has just taken place; a large fire is put in the box and blower applied, so that we have steam on, before the water around mud ring is hot, and often after the engine has gone a short distance on the road we get word from the train dispatcher that the fruits of our abuse has shown itself in a dead locomotive that is blocking traffic. This is not an exaggerated picture, but fortunately it is getting to be understood that this condition can be improved at a reasonable cost.

In taking the question up with a number of superintendents of motive power, who are using various devices having the object of washing out, changing water and raising steam quickly, by the use of hot water, and live steam where necessary, the following information was gathered:

1. That there are four or five different systems in use.
2. They have been in use from one to three years.
3. The cost is from $5,500 to $20,000, depending on size and number of stalls equipped, or at 5 per cent. interest would means an expense of from $275 to $1,000 per year.
4. In the various systems reported, statement is made that they are entirely satisfactory.
5. With this installation they can wash out and get ready for service 20 to 26 engines per 24 hours.
6. The average time to wash out and get an engine ready for service, is from 55⅛ minutes to 4 hours 15 minutes.
7. Average time formerly taken, 3 to 6 hours.
8. Practically no change or improvement made since installed, one user saying that in his system he would suggest a settling well, so that water blown out of boiler might be utilized again after the mud and scale had been deposited.
9. In all cases a very marked reduction was reported in flue leakages and broken staybolts, although very little data were available on this subject. At one point it had been possible to reduce the number of boilermakers employed from ten to four, because of the decreased boiler work, since the hot water washing-out system has been installed.
10. Some of the other benefits derived are given as follows: No evidence of steam in roundhouse. Always plenty of water (hot) to refill boilers at 212 degrees. Temperature of water reduces time and fuel necessary to get engine hot. Facility in turning engines, reduction of engine failures, reducing overtime. Reduction of time at terminals where washing out in necessary.

Probably the most important saving that is effected by the hot water changing or wash-out system, is the rapidity with which the work can be done, and thus get engines into service from one to two hours quicker than could possibly be the case with a cold-water system, which necessitates cooling an engine down after the steam has been blown off, before the engine can be washed out, and then directly after bringing the water back to the original temperature that it was when engine came in off the clinker pit; such waste of heat, which means coal, would not be tolerated under any other conditions, but takes place daily at hundreds of roundhouses in this country, without any protest from the people causing this waste.

A simple arrangement used on one of the western roads with very great success, for utilizing steam and water otherwise wasted, is to have wells into which cold water flows from the main, or source of supply, and to heat it, steam and hot water from engines is blown off into well; from this place the water is pumped for washing out and filling boilers. This is probably the cheapest system for furnishing hot water, but it has the objection of using water that has been blown from dirty boilers; but as only a boilerful is taken, it is soon diluted and rendered innocuous by the fresh water injected into it from the tank.

The following actual savings have been reported:

Decreased cost of washing boilers; in 1906 with cold water, for labor alone it cost $1.32 per boiler, whereas, with hot water in 1907, $1.01 was charged against this item, or on the road reporting it, a saving of $2,019.95 per year for labor alone, in washing boilers, was effected on an outlay of $6,000.

Decreased cost of water used; this item may not appear at first sight to amount to much, but where a saving of 7,000 gallons for each boiler washed out can be effected, as has been reported, this, at 7 cents per thousand gallons, in Chicago, amounts to 49 cents per boiler washed. It is the opinion of your committee, however, that this estimate of the amount of water saved is high.

Decreased amount of coal used; on one road this is given at 140 pounds per engine, which is probably low; this at $2 per ton would amount to 14 cents.

With the three items mentioned we get a saving per engine of: Labor, 31 cents; water, 49 cents; coal, 14 cents; total, 94 cents.

The saving of time at the roundhouse is probably, in busy seasons, more of an object than anything else we have mentioned, and as this amounts to cutting the time in half for washing out, it means, assuming that engine is not held for any other work, that with 1,000 engines, each turned two hours quicker than was possible with the cold-water system, you have a saving of 2,000 engine-hours, and as engines generally have to be washed out once a week, or four times a month, in bad-water territory, it amounts to 8,000 engine-hours a month, or 96,000 engine-hours a year; this, if the engines have to be rented at $10 a day, which is a low figure for a large engine, in busy seasons, would cost $40,000; or, putting it another way, working 365 days of 12 hours each, it would require practically 22 additional engines to equal the 96,000 engine-hours a year, which at $15,000 per engine, would mean an expenditure of $330,000.

In conclusion, your committee recommends that boilers be washed out and filled with hot water, and that the savings obtained by doing so will pay a good interest on the necessary investment.

*A report presented at the annual convention of the American Railway Master Mechanics' Association at Atlantic City, N. J., June, 1908, by a committee consisting of H. T. Bentley, L. H. Turner, S. K. Dickerson, M. E. Wells and H. E. Passmore.

To assure good accommodations, Pullman reservations should be made at once.

BLANKS FOR REPORTING WORK ON ENGINES UNDERGOING REPAIRS.*

The committee on "Blanks for Reporting Work on Engines Undergoing Repairs," which reported at the last convention, was continued for the purpose of submitting additional reports showing the condition of locomotives in service in addition to those undergoing repairs.

We submit "Exhibit G," which we believe covers in concise form the additional information desired. This report should be made monthly by the division master mechanics to the superintendent of motive power.

The daily reports referred to in the discussion of this subject at the last convention would be of service to division officials, but we believe that such a system cannot be successfully handled by the general officers of a large railroad and that on railroad systems owning 500 locomotives, or more, a monthly report of the conditions from the division officials is preferable to a daily report. We submit this report as a supplement to the original report. [See The Daily Railway Age, June 14, 1907, page 996, for original report.—Eds.] When your committee made its original report it did not understand that a report showing "Work on Engines Undergoing Repairs" should include a report on "Condition of Engines in Service."

A, B AND C RAILROAD COMPANY.

STATEMENT OF CONDITION OF LOCOMOTIVES ..... DIVISION 190

F=Fair. B=Bad. X=10 Months' Service or More.

Engine.	Boiler			Machinery						Available Months Service Before Shopping	Last Repaired		Class of Repair necessary for Engines to be Shopped within three Months	Remarks
	Months service			Months service				Tires						
	Fire Box	Flues	General	Cylinders	Frames	General	Tires	Wear in 32nds	Present Thickness Inches		Date	Class		
11	X	1	1	X	X	1	1	7	2 23/32	1	2-07	13	20	
38	X	5	5	X	X	5	5	7	1 15/32	5	3-07	6		
39	5F	8	8	X	X	8	8	1	2	8	1-08	4		
41	X	1	1	X	X	1	1	7	2 11/32	1	4-07	19	20	
IN SHOPS														
441	X	9	9	X	X	9	9	0	3	9	5-06	12	18	
780	X	X	X	X	X	X	X	0	3	X	3-07	17	24	
1204	X	X	X	X	X	X	X	0	3	X	3-07	14	25	
OUT OF SERVICE														
318	1F	1	1	X	X	1	1	8	2	1	9-06	12	12	
778	X	1	1	X	X	1	1	6	1	1	4-07	35	24	

RECAPITULATION

	In Service	In Shop	Out of Service	Total	Required Shopping In 3 Months
No. of Engines	22	3	2	27	9
Percentage	81.5%	11%	7.5%	100%	33.33%

Blanks for Reporting Work on Engines Undergoing Repairs—Exhibit G.

MECHANICAL STOKERS.†

The mechanical stokers used on locomotives in this country up to the present time have at least demonstrated the fact that freight and passenger engines, in road service, can be successfully fired by mechanical means. Mechanical stoking, however, has not made much progress abroad. In reply to an inquiry on this subject, G. J. Churchward, chief superintendent of the locomotive, carriage and wagon department of the Great Western Railway of England, says: "We have tried some mechanical stokers, but with our lump coal and the amount per mile we use, neither of the appliances I have yet seen has any prospect of superseding hand firing. Our average consumption per engine miles over the whole railway is only about 40 pounds."

Your committee is advised that some experiments are now being made with an underfeed type of locomotive stoker, and other forms are also undergoing experiments on various railroads throughout the country, and in presenting this progress report, your committee, while acknowleding its indebtedness to those who have kindly communicated the results of stoker trials, yet feels that the data so far available has not been sufficiently conclusive to warrant its being formally presented to the association.

Stokers concerning which your committee has been able to obtain some information since the 1907 convention are the Victor (formerly the Day-Kincade), the Crosby, the Hayden and the Strouse types. It may be observed that the Day-Kincade stoker originated on the Chesapeake & Ohio Railroad and the earliest experiments with this device were made on that road.

The report concludes with descriptions and illustrations of these devices which it is stated have been compiled chiefly from accounts published at various times in the columns of Railway and Locomotive Engineering.

*Report presented at the annual convention of the American Railway Master Mechanics' Association at Atlantic City, N. J., by a committee consisting of Theo. H. Curtis, E. W. Pratt, C. H. Quereau and F. W. Lane.

†Abstract of a report presented at the annual convention of the American Railway Master Mechanics' Association at Atlantic City, N. J., June, 1908, by a committee consisting of William Garstang, D. F. Crawford, J. F. Walsh, L. R. Johnson and George S. Hodgins.

The Boston Railway Times, in November, 1867, gave the number of miles of railway in operation in the United States at that time as 36,000; and the number of passengers conveyed upon them in 1866 was estimated at 143,226,000. The interstate commerce commission's report for the year ending June 30, 1906, gives the number of passengers carried that year as 797,946,116, and the miles of railroad line in the United States at 222,340.

Elephantine Exotics in Railroad Wrecks.

The "Railway Times of Bombay, India, in its issue of October 12, 1907, states that on the morning of September 23 an elephant, said to belong to the Sub-divisional Officer Alipur Duar, was driven to the Terrai forests to fetch fodder. The beast was crossing the railway line somewhere up near Alipur Duar station when a down ballast train in motion tried to whistle him off the line. He obeyed the whistle, but instantly was on the line again and pushed the engine back with all the strength he could muster, causing the derailment of the engine and one of the trucks. The driver fell off and received some injuries, and the mahaut, who had apparently lost all hold over the animal and had perhaps anticipated the accident, jumped down but was unhurt. The elephant was only bruised. In commenting on this the Railway and Locomotive Engineer says: "There is no knowing what kindness can accomplish, and if these men had treated the elephant half decently he might have been induced to wait a few minutes and put the engine on the track again, while they fixed up the track."

With Exhibitors and Others

There is to the mechanical eye a real beauty in strength or in evident adaptability to purpose, and in this sense the June mechanical conventions are genuine "Beauty Shows." As at every "Beauty Show" there are types for every taste, so here there are varying types of flange unions, gasketless and otherwise. The National Tube Company directs especial attention to the Kewanee flange union with the brass to iron seat which makes a tight seal even when the pipe is out of alignment.

* * *

A unique exhibit of the Yale & Towne Manufacturing Company, space 215, consists of a sample board of keys, dating from the present back for several centuries. A practical comparison is made between the massive keys of several hundred years ago and the small beautifully finished paracentric key which has helped to make the Yale lock famous for security in the present day.

* * *

The Farlow Draft Gear Company is exhibiting this year's designs on its draft gear, which should be of keen interest to railway people. There are a large number of prominent railroads using this device extensively and it is said to be proving satisfactory in every respect. The Farlow attachments are being widely used in connection with the various friction devices and have proven ideal for this purpose. They are claimed to prevent the spreading of the sills, or draft sills as the case may be, and by an equal distribution of the shocks at eight points from the end sill to the body bolster inclusive, the punishment to the car from severe shocks is reduced to a minimum.

* * *

Buckeye lights, heaters, tire expanders, oil rivet forges, weed burners, paint and whitewash sprayers, sand blast machines and locomotive sanders are among the specialties handled by the Maryland Railway & Electric Supply Company, of Baltimore, as sales agent for southern territory.

* * *

While trainmen are instructed to lock up couplers when they are separated, they are often neglected, causing damage to hose and coupler and sometimes serious accidents to trains. Gold's automatic lock and hose support is designed to support the couplers whether coupled or uncoupled.

* * *

The National Lock Washer Company of Newark, N. J., has recently doubled its capacity for making nut locks, and provided a large 3-story building for the accommodation of another line of railroad devices, car curtains, curtain fixtures, sash locks and sash balances.

* * *

The Boston Transit Commission, which is building the Washington street subway for the city of Boston, is installing carborundum Mason safety tread on all stairways in the system. This undertaking, which is the largest of its kind in New England, is rapidly approaching completion, when it will be taken over by the Boston Elevated Railway.

* * *

The Commercial Acetylene Company of New York is showing its Safety storage system as applied to car lighting, locomotive headlights and signal lights in booth 205 to 211. The numerous lights in the booth are all supplied from one tank 20 by 114 inches which holds 2,000 feet of acetylene at 150 pounds pressure. Another tank of the same size is cut open showing how all its tanks are packed with asbestos discs so that there is no free gas in the tank. Acetone is used in connection with the asbestos and absorbs 25 times its own volume of the gas at 150 pounds, increasing the capacity ten fold without any increase pressure, making it possible for a car to make several trans-continental trips on one charge. The booth in which this display is made has all of the latest designs of acetylene lighting apparatus, and Messrs. Ostby, Faure, Doran and Sawyer representing the company will be pleased to give the details of some of the recent successful installations of plants in various parts of the United States.

* * *

The special molders' plumbago of the Otley Manufacturing Company, Chicago, has been developed through careful study of conditions to meet all of the requirements for making satisfactory castings. A small quantity for test will be sent by the makers, on application.

* * *

J. F. Comee, in booth 532 with the Nathan Manufacturing Company, is on hand to tell of the merits of a metallic packing made by the Comee Metallic Packing Company, Stevens Point, Wis. This packing has been successfully used on some locomotives on the Harriman lines.

* * *

The Scullin-Gallagher Iron & Steel Company has made a specialty of locomotive frames, driving wheel centers and miscellaneous castings, and its representatives will be glad to show visiting members designs and cuts of all these parts at the company's exhibit on the pier, spaces 117 to 121 inclusive.

* * *

One of the latest and most important improvements in pneumatic machinery is shown in the exhibit of the Independent Pneumatic Tool Company. It is a complete cut-out working model of the Thor No. 8 close corner and close quarter drill. The tool has capacity for 2-inch drilling and weighs only 26 pounds. It is about 7 inches in overall length, and the distance between the center line of spindle and outside of case is 1 5-32 inches. The power and durability of the machine are apparent from the model, which is well worth inspection.

* * *

Of special interest to railroads in cotton-growing regions is the invention of a vacuum cotton-picking machine which is being put on the market by the Vacuum Cotton Picking Machine Company, St. Louis, Mo. Because of increased efficiency and economy in gathering the cotton in the fields, a successful cotton-picking machine should result in a largely increased acreage of this staple. It is stated that the machine in question will do the work of seven men, but much more efficiently, drawing every fiber from the boll, which the manual method fails to do.

* * *

The Commonwealth Steel Company has a boltless coupler carrier at booth 311 which makes it possible to drop a coupler in an instant by merely removing one cotter pin. In making a replacement of a broken coupler or draft gear a saving of from 30 to 60 minutes per car will be effected over the usual bolted carrier, together with elimination of bolts. A metal dead block is also shown in conjunction with the one pin coupler carry iron. This combination is not only a great time and labor saver but also adds much to the simplicity and strength of the car.

* * *

The Adlake acetylene car lighting system is being installed in the new order of 27 Northern Pacific passenger cars. This system is being demonstrated at the exhibit of the Adams & Westlake Company.

* * *

"Sanford," an Angora goat of prize breed, is on his way to Atlantic City to pose in the exhibit of L. C. Chase & Co. Unfortunately "Sanford's" soul departed for the happy hunting grounds some time since; but the long shaggy coat he left will tell why the grade of Chase mohair plush is so high. "Sanford" bears the name of the grand champion buck (Angora goat show, Dallas, Oregon, 1907) owned by U. S. Grant, which in turn was named after the Sanford Mills,

manufacturers of the Chase goat brand of plain and prize plushes for car seats and upholstery. L. C. Chase & Co. are represented at the convention by R. R. Bishop, Jr.

* * *

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* * *

The Flannery Bolt Company, Pittsburgh, Pa., in space 538, is exhibiting a model of a locomotive fire box showing a new method of radial staying, which provides a flexible stay bolt. This model should be of especial interest to the master mechanics, being a departure from old methods.

* * *

The Watson-Stillman Company has patented a jack on wheels, and is showing in its booth a 40-ton wrecking jack mounted. Two wheels are so arranged that when the jack is upright and in working condition the base is square on the ground and the wheels, which are fixed above the line of the base, are lifted clear. This jack weighs 350 pounds and may be handled by one man with the greatest ease.

* * *

Whiting Foundry Equipment Company, Harvey, Ill., (Chicago suburb) shows in space 113, Entrance Hall, about 150 photographs of recent installations, including electric traveling cranes, transfer tables, turntables, hand and electric trolley systems, job cranes, grab buckets, cars, complete foundry equipment, brass foundries, steel plants, car wheel plants, etc. There are now about 5,000 car wheels per day being made by the famous Whiting straight line system.

* * *

The Draper Manufacturing Company, Port Huron, Mich., makes a specialty of the manufacture of brass and steel balls for valve purposes for use in pumps, check valves, etc. Its hollow brass balls are carefully balanced by a special method and are perfectly spherical. Many companies are reconstructing their pumps of various kinds to use ball valves. The company has just completed an order for 2,900 2½-inch brass balls for one of the large pipe line companies, and has another order for 900 2½-inch balls from the same company. Notwithstanding the great decline in all business the company reports its business in balls larger than it has ever been.

* * *

Agosote headlining, on exhibition at the booth of the Pantasote Company, New York, is made in one solid piece, which is a distinctive difference from other linings which are made up of several laminations. Agosote has been adopted as the standard headlining for all new equipment of the Pullman Company. In the ten steel cars now building at Pullman, with steel sheeting outside, Agosote is specified for the entire inside finish, including all panels, partitions, bunk heads, mouldings, doors and headlinings. The exhibit in booths 456-459 further includes a Pullman panel, partitions, and bunk-head. There is no warping, contraction, expansion, blistering or separation of the fiber in this lining. It is impermeable, homogeneous, a perfect insulator against summer heat and winter cold, and is certainly water-proof, as shown by the exhibit.

* * *

The St. Louis Surfacer & Paint Company of St. Louis, more generally known as the railway paint specialist, reports that its products are being used more extensively than ever on freight cars, bridge work and passenger equipment and with great success. Friends of the company will be welcomed at the exhibit which is the booth of the U. S. Metal & Manufacturing Company.

* * *

Machinery for railroad shops has been the output of the National Machinery Company, of Tiffin, Ohio., for many years. The improved line of heading, upsetting and forging machines, bolt and nut machines and bolt and nut headers manufactured by this company should not be overlooked, but on the contrary examined carefully by railroad officers in the planning of new equipment for shops.

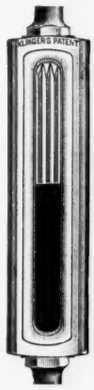
* * *

The Ureco pneumatic track sander at the exhibit of the U. S. Metal & Manufacturing Company is intended to make a man from Missouri sit up and take notice. Only one pipe from the sand dome is necessary, and the valve is so arranged that by the operation of the lever, the sand is kept in motion, preventing any stoppage.

* * *

All those who are interested in a line of special drop forgings made of iron, steel, copper, etc., are invited to visit the exhibit of the Keystone Drop Forge Works at space No. 379 in the Amusement room.

* * *



The Klinger patent reflex water gage, included in the exhibit of the Nathan Manufacturing Company, New York, consists of a metallic casing, capable of withstanding a high pressure, which may be attached to any boiler. Into this casing is inserted a specially hardened observation glass, ½ inch by ⅝ inch in thickness. This observation glass is so shaped that it will reflect the light in that part of the gage which contains the steam, this part of the glass becoming of an opaque and bright lustre, while in that part of the gage containing the water the light is not reflected, but passes in a slight deflection to the rear of the gage. The black background of the casing is thus seen through the transparent part of the gage.

* * *

Berry Brothers' unexcelled railway varnish can be seen on several of the handsome new coaches in the track exhibit at Atlantic City.

* * *

Bignall & Keeler Manufacturing Company, of Edwardsville, Ill., make a pretty strong statement when they say that their Peerless No. 4 pipe machines for railroad shops are the most rapid, accurate and durable machines made. Many satisfied railroad customers seem to prove the statement.

* * *

Chas. M. Rein, of Houston, Texas, is showing the Schulz metal hose in the booth of the Barnett Equipment Company. This is an all-metal hose with a series of joints which in effect is a universal joint, but at no combination angles will there be any constriction of the lumen of the opening through the pipe. It is designed for use between coaches for transmission of steam or air-brake and signal connections.

* * *

At the Adams & Westlake Company's booth will be found in full operation the latest type of the Adlake-Newbold electric car lighting equipment. Since last year its weight has been materially reduced without sacrificing strength or electrical efficiency. Various attractive lighting fixtures are also displayed.

* * *

The Wells Light Manufacturing Company has no fixed exhibit; but Mr. Robinson is carrying around with him a quarter size model of the Wells light. The flame is represented by an electric light bulb which is illuminated at will by a dry battery.

* * *

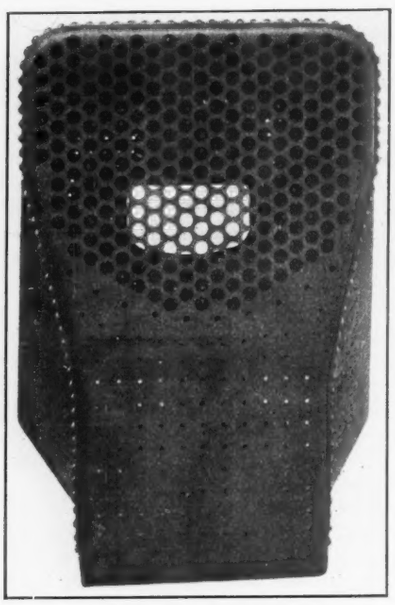
New and improved designs and durable materials in smoke jacks are shown by Paul Dickinson, Inc., spaces 165 and 167. These are of the same equality that have made the Dickinson jacks an acknowledged standard for a quarter of a century. The manufacturers also have on exhibition an "Everlasting" cast iron caboose jack. The features of these articles will gladly be shown by Messrs. W. A. Bither, A. J. Filkins and J. A. Meaden.

BOILER OF PACIFIC TYPE LOCOMOTIVE FOR THE PARIS-ORLEANS RAILWAY.

The accompanying illustration shows the general appearance of the boiler for a 4-cylinder De Glehn compound Pacific type locomotive, 30 of which are now being built at the Schenectady works of the American Locomotive Company for the Paris-Orleans Railway. These engines are being built to drawings and specifications furnished by the railway company, the dimensions on the drawing being in the metric system. As will be seen from the illustrations, the boiler design presents a number of features which differ from American locomotive practice.

The boiler is of the straight top type with Belpaire firebox, the inside firebox being of copper. All the staybolts in the water legs are of manganese bronze, while the crownstays and other boiler stays are of Falls Hollow staybolt iron.

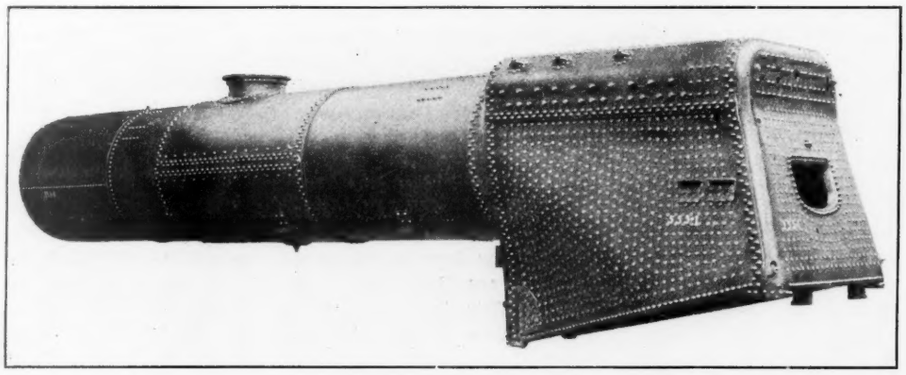
One of the most interesting features of the boiler is the shape of the firebox which is shown in the illustration. In these engines, the rear driving wheels, instead of being ahead of the firebox as they are in the ordinary American design of Pacific type engine, are so located that they extend back of the front end of the firebox. As a result, the firebox which extends out over the frames at the back end is made narrow at the front end to come between the frames.



Boiler for Paris-Orleans Locomotive.

The mud ring is inclined toward the front at a sharp angle, giving a depth of throat sheet of 890 millimeters (35.04 inches), which is considerably greater than is usually found in American locomotive design.

The boiler is built up of three courses, the outside diameter of the first course being 1.68 meters (66.14 inches). It contains 261 tubes, 55 millimeters (2.165 inches) in diameter and 5.9 meters (19.36 feet) long, spaced so as to provide 17-millimeter (0.67 inch) bridges. All the longitudinal seams are butt jointed sextuple riveted with welt strips inside and out.



Boiler for Paris-Orleans Locomotive.

Miss Dearborn from Paris.

Miss Dearborn, from Paris, who is at the booth of the Dearborn Drug & Chemical Company, probably has attracted more attention than any other of the many fair women who have seen the exhibits. Miss Dearborn is a blonde of rare charms of person, her beautiful figure being admirably set off by a directorie gown. Not being able to speak the English language, she has been unable to entertain the delegates and their friends as she would have liked, but she has nevertheless enjoyed every minute of her time here, and she will return next year wearing, as she does this year, the latest gown. She is in entire charge of the perfume fountain in the Dearborn Drug & Chemical Company's booth, from which purple hyacinth flows all day, making the atmosphere odorous with the breath of flowers. The ladies visiting the booth all have their handkerchiefs bathed in the perfume. Because the beautiful lady in charge of the fountain is "afraid to go home in the dark," she is provided with a lantern. Miss Dearborn was designed and has been patented by H. G. McConnaughy, of the New York office of the Dearborn Company.

GENERAL RAILWAY SUPPLY COMPANY.

One of the most attractive exhibits at the convention is that of the General Railway Supply Company, Marquette Building, Chicago, consisting of the stub end of a passenger coach with full size vestibule complete, showing in position the various specialties and devices handled by this company, including: Metallic (steel) sheathing and lining, steel sash rest, steel door and window lintels, steel letter board, steel corner post casings, steel pilasters, battens, angles, etc.; National steel trap doors and lifting device, Schroyer friction curtain rollers, Garland ventilators, National standard roofing, Ideal Roller center bearings, Flexolith composition flooring and National automatic vestibule curtain catches.

The exterior sides and ends of the car are covered with metallic (steel) sheathing, made of steel plates pressed to an interlocking formation for application on a wooden frame or on steel construction with screws and rivets respectively in such manner that the method of fastening is not discernible on the exposed surface, there being no rivet heads or screw heads in sight. Every detail in connection with the application of the other parts, such as sash rest, lintels, etc., has been carefully worked out, thus giving an attractive exterior.

One of the main advantages claimed for this sheathing is the formation of air chambers between the inner and outer walks, and by plugging up the bottom and top openings with wood or asbestos, dead air chambers are produced, thus providing the best kind of insulation against heat and cold. The fact that the sheathing is furnished direct from the factory with two priming coats of paint baked on is an important factor and effects a saving in time and expense. The sheathing has been applied to several new coaches built for the Chicago & North Western and the Acheson Topeka & Santa Fe, also to 31 new St. Louis & Santa Fe baggage cars having steel frames. The Pullman Company has adopted it as standard and is now applying it to all of its new cars, having in service 125 cars with this sheathing on the exteriors.

The General Railway Supply Company is represented by H. U. Morton, vice-president.

BARBER DOUBLE ACTION ROLLER-BEARING TRUCK.

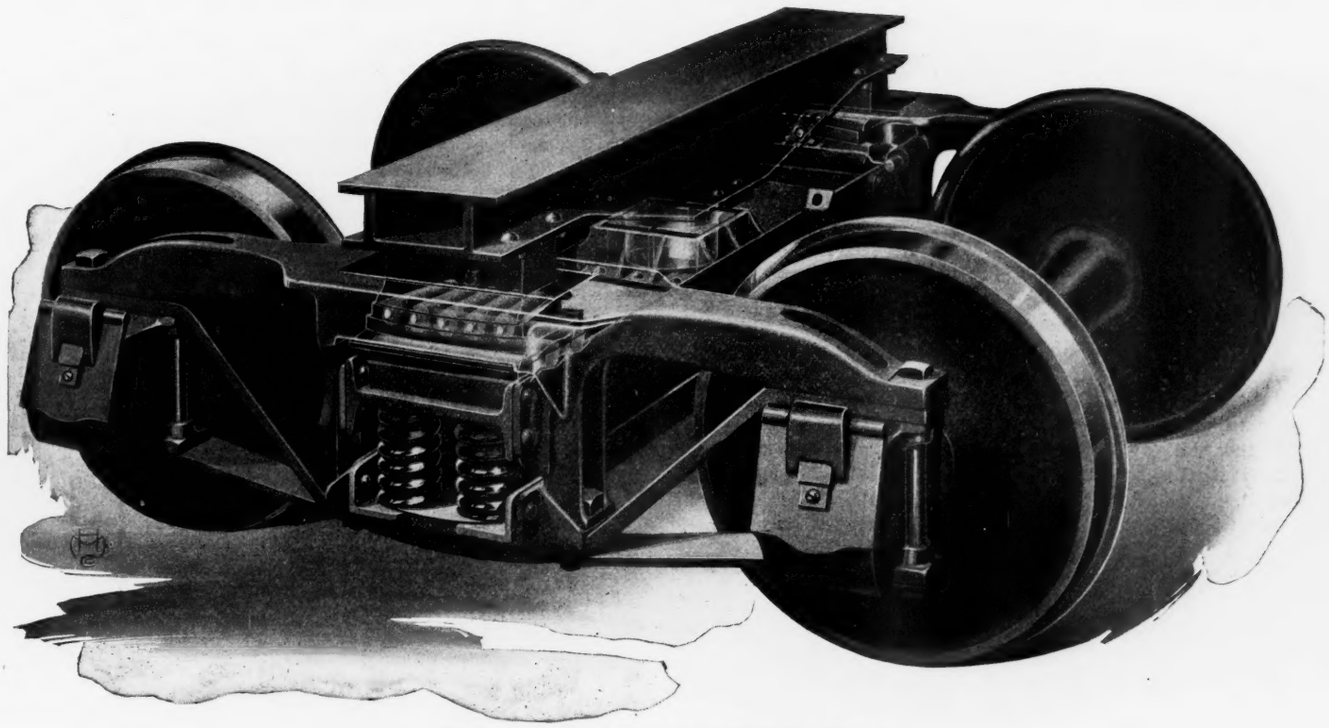
J. C. Barber, president of the Standard Car Truck Company, has on exhibition a quarter-size truck model which is attracting a great deal of attention and much favorable comment. It is called the Barber double action truck, as it combines the well-known roller lateral motion device with rollers for radial travel. These double acting rollers are located at the center of the side frames and all of the weight of the car body is thus supported at two points on each truck.

The center pivot carries no weight but merely acts as a guide to propel the truck. With this design lighter truck and body bolsters may be used than are used at present where the load is carried at the center.

With the exception of the bottom arch bar and tie bar the side frame is made of cast steel with a rectangular opening at the top where the roller device is located. This opening is long enough to provide for any service condition of radial travel, but in case of derailment the bearing block on the body bolsters interlocks with the truck frame and prevents the truck from running off at any great angle from the track.

Otherwise springs, boxes, wheels, etc., are same as present practice. With the design as described resistance to curving is greatly decreased and the life of wheel flanges, draw bar knuckles, beams, etc., greatly lengthened.

A car equipped with trucks of this design has been in service for 18 months and is making a very favorable showing.



Barber Double Action Roller-Bearing Truck.

THOR PISTON AIR GRINDING MACHINE.

A very interesting machine is shown at the exhibit of the Independent Pneumatic Tool Company. It is called the No. 7 Thor portable grinding machine, and is similar in design to the Thor piston air drills, but has very high piston speed, connecting direct by means of a flexible joint to the grinding spindle. This spindle is run with adjustable ball bearings and will not heat, and is lubricated automatically from the drill. The outer end of this spindle is threaded, and on this may be attached suitable means for carrying emery wheels, buffing wheels, sand paper discs, and other similar devices, also grinding appliances for hand-hole plates in water tube boilers, etc. This machine is used extensively in railroad and car shops for machine grinding channel ends. The grinder runs at a speed of 3,000 revolutions per minute and weighs 20 pounds.

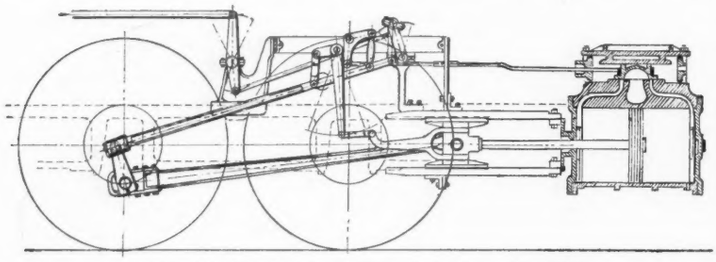
SYMINGTON REFINED IRON JOURNAL BOXES.

The T. H. Symington Company anticipates a largely increased business in journal boxes for passenger cars by the introduction of its "Refined Iron" for this class of service. It is generally admitted that passenger car journal boxes of malleable or ordinary gray iron very soon wear out in the pedestal ways, and also give trouble due to the rapid wear on the equalizing seat. By a series of very careful tests, the Symington company has demonstrated the superior wearing qualities of "Refined Iron" as compared with either malleable or gray iron, and in its exhibit space, No. 367-377, the practical manner in which these tests are made is illustrated. Many attempts have been made to reduce the wear occurring in the pedestal ways of malleable iron journal boxes by the use of steel inserts. These inserts protect the box, but the saving in wear thus effected is more than offset by the very marked increase in the wear of the pedestal.

The American Steel Foundries, Chicago, show in space 169-181 a steel truck, which is fitted with American steel specialties. It has the Davis cast steel wheels, Simplex truck bolster, cast steel body bolster, Simplex brake beams, Simplex springs, Susehime roller side bearings and cast steel journal boxes. There are also shown the R. E. Janney coupler, the Simplex coupler, with top and also special bottom operating device, by which the knuckle is uncoupled from a lever on the side of the car, also the Leeds pilot coupler. The exhibit includes brake beams of solid edge construction; a Hercules trussed beam, which employs a channel for the compression member and rod for tension member, adaptable to both freight and passenger service with either stationary or adjustable head; coil and elliptical springs; Sloan spring controllers and a number of miscellaneous locomotive castings.

BAKER-PILLIOD VALVE GEAR.

The attainment of a higher efficiency from a given cylinder and valve arrangement of given dimensions must of necessity be preceded by an improved steam distribution, causing greater mean effective pressures on the pistons and a higher range of temperature in the cylinders. This may be effected by an improvment in the method of actuating the valve. The Baker-Pilliod valve gear, it is claimed, provides uniform lead, and cut-off, late release and compression, balanced compression and total absence of pre-admission. The motion of the valve is derived from two independent sources: from the main crank by connection to the crosshead, and from an eccentric crank opposed at right angles to the main crank. A swinging lever, or radius bar, is suspended from a reversing yoke and is movable to any desired angle to impart the required throw and cut-off. The lever action of the eccentric arm actuates the lap and lead and maintains the lead constant. The crosshead connection takes care of the



Baker-Pilliod Valve Gear—Outside Admission.

lap and lead when the radius arm and the reversing yoke are in central positions, so that in mid-gear practically all of the motion of the valve is through the crosshead connection. By moving the reverse lever forward, the angle of the reverse yoke is changed and brought into combination with the main imparting motion, toward the eccentric arm, the opening motion of the valve being accelerated for the forward motion of the locomotive. In the backward motion the reverse yoke is changed to an opposite position, while the path of the valve rod remains the same as in the go-ahead motion. This reversing action requires no change in the reciprocating parts, no readjustments of its bearings or alignment, only a movement of the positive-connected radius arm, which, it is claimed, overcomes these objectionable points in a link-motion gear; also that this is the only single-valve gear which produces a dwell upon the opening and closing of the valve, and yet makes these events quick-acting.

Comparison of a table of valve events from the Baker-Pilliod gear with similar tables from Walschaert and Stephenson gears taken from last year's proceedings of the Master Mechanics' Association shows the greatest range in these events for the first-named gear. There is a uniform lead at all points of cut-off. For the entire stroke there is a later release and later, and more nearly balanced, compression than in either of the other gears and with the exception of cut-off at 20 per cent. a total absence of pre-admission. There is also less compression and back pressure in the short cut-offs. There is no difference in the parts for inside and outside admission; the eccentric crank leads the main crank for outside admission throw, it is said high speeds have no harmful effects. Nor are there any loose, sliding or lifting joints or link blocks. The weight of the gear is given as about 40 per cent. of that of the Stephenson and 60 per cent. of that of the of that of the Stephenson and 60 per cent. of that of the Walschaert, and the cost of maintenance one-half of the Stephenson.

A higher mean effective pressure is claimed for this gear than for either of the others; also that only 5 per cent. of the piston travel is required for full port opening; a dwell is produced upon the opening at 45 per cent. cut-off; the valve closes at 70 per cent., and there is effective expansion to 95 per cent. of the travel

THE RALSTON CARS.

There are two cars in the track exhibit on Mississippi avenue which are offered as embodying the advantages of the ordinary box or gondola car and the drop bottom self-clearing car for coke and coal. One of these cars is a gondola of 100,000 pounds capacity and the other a stock car of 60,000 pounds capacity. At the first glance the gondola is striking because of the great depth of the center sills. They are of the deep-center type and are plate girders built up of a single plate, ¼ inch thick, stiffened at the top and bottom edges with 4 inches by 3 inches x ½ inch angles riveted to each side. These center sills extend through and 18 inches beyond the bolsters. The bolsters thmselves are formed of two pressed steel diaphragms that have flanges turned on them to lay against the web plate of the sills. At the bottom they are riveted to a cover plate that extends from one side of the car to the other. The top edge instead of being turned with a flange extends up between two 8-inch channels placed back to back, which run across the car. There are two of these diaphragms on each side, placed back to back, so that the requisite width for the resistance of the longitudinal stresses is obtained. The portion of the main center sills extending beyond the bolsters serves as a point of attachment for the continuation of the center sills to the end of the car. These are made of 12-inch channels with webs riveted to the plates of the main center sill by sixteeen ⅞-inch rivets. These channels are set with their tops somewhat below the main sills and with their centers on a line with the center of the coupler. They take the whole of the hauling and buffing stresses, which are borne in turn by the shearing resistance of the thirty-two ⅞-inch rivets referred to in connection with the plates of the main center sill.

The end sill is formed ot an 8-inch channel bent out at the center in truss form and backed by a pressed steel cover plate riveted to the upper flange. This end sill is set 8 inches above the top of the center sills, to which it is connected by a light steel casting having a smooth front face which serves as a stop for the horn of the coupler. There are no side sills to the car if the 8-inch channels that run from the body bolsters to the corners be excepted. These transmit to the bolsters the corner stresses applied at the push pole pockets or by accident. The floor is carried by five intermediate cross-ties in addition to the bolsters and end sills. They are each composed of an 8-inch channel with formed cover plate, and have a length equal to the total width of the car. Two of these cross-ties are fitted with gusset braces dropping down to the bottom of the center sills.

In this way the total load is carried to the center of the car and the whole of it put on the center sills, no dependence at all being put upon the stiffening effect of the sides.

The whole floor of the car consists of a series of doors, hinged along the center line and held in place by a long crank shaft extending from one end of the car to the other. This crank shaft is carried in bearings riveted to the bottom of the end sills and bolsters and each cross-tie. Between each of these points it is cranked upwardly and carries three rollers spaced at proper intervals that bear against the bottom of the floor trap. This crank shaft has a throw of 21¾ inches and when it is dropped the doors open down to an angle of 38 degrees with the horizontal, so that all material contained in the car is discharged outside the rails. The car stands high enough at the floor so that the same condition prevails over the trucks at the center of the car. The crank shaft is held and operated at the ends, where it is fastened by a

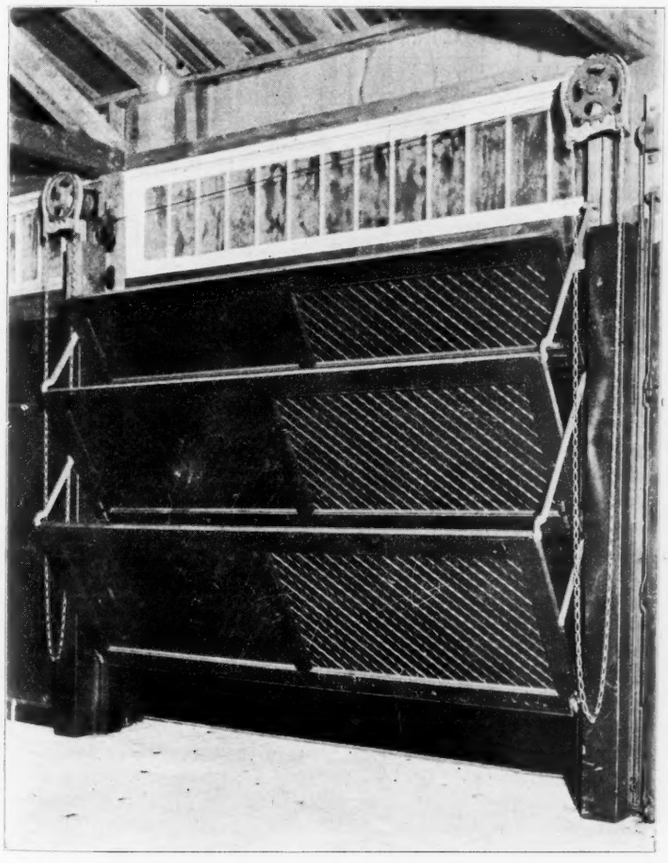
dog in addition to a lock at the center, and is turned by a ratchet and lever. That car is, thus, entirely self-clearing, requiring no shoveling.

The stock car is of the same general type of construction, with some modifications of detail. Principal among these are the center sills, which are of 15-inch channels with top and bottom cover plates that run from end to end of the car. The end and side sills are of wood, but the cross-ties and bolsters are of the same character as those of the gondola. In this car also the floor doors occupy the whole area so that any load of coke or similar materials can be entirely cleared.

About 5,500 of these gondolas are now in use and are reported as giving entire satisfaction. The same statement as to operation may be made regarding the stock or general service car.

RITTER FOLDING DOOR.

The accompanying engraving shows a Ritter folding door of wood. These doors are adaptable for depot, roundhouse, machine shop or warehouse, being quickly and easily operated. Any or all leaves may be glazed, made of wood, plain or tinned, of sheet or corrugated iron, of reinforced cinder concrete or of any fireproof materials desired. When used as fireproof doors, a fusible link for automatic closing may be attached. The small space of 18 inches is required for operating mechanism and counterweight.

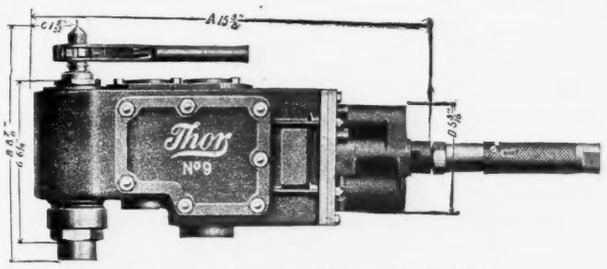


Ritter Folding Door.

The time consumed in moving jacks about in a round house seldom appears in such form that its cost may be computed, but the cost is there. In a 30-stall round house, when the engine to be repaired is on track thirty the jacks are usually at track one. A 40 ton jack weighs 350 pounds. Two men are required to handle it.

THOR CLOSE-QUARTER PISTON AIR DRILLS.

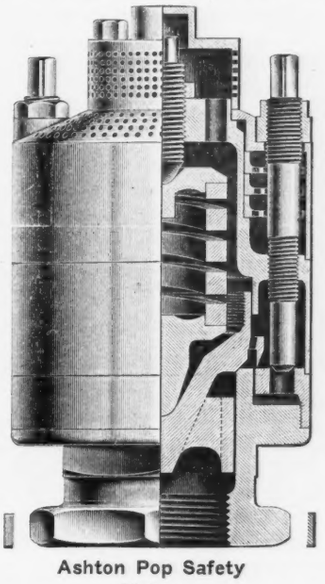
In response to a demand for an air drill suitable for use in close quarters the Independent Pneumatic Tool Company, of Chicago and New York, brought out two drills designated as Nos. 8 and 9 Thor close-quarter piston air drills, the former being designed for drilling up to two inches in diameter and reaming and tapping up to 1¼ inches in diameter, and the latter for drilling up to 3 inches in diameter and reaming and tapping up to two inches in diameter. The No. 8 drill weighs 26 pounds and the No. 9 drill 30 pounds. These drills have been subjected to the severest tests in some of the largest railroad shops in the country, are conceded to be very economical, powerful, efficient and indispensable for use in close quarters where the ordinary drill cannot be used. The No. 8 machine can be operated within 1 5-32 inches of a corner, the advantage of which is apparent.



Thor Close-Quarter Piston Air Drills.

ASHTON LOCOMOTIVE MUFFLER POP SAFETY VALVE.

Ever since the introduction of the first Ashton patented muffler valve there has been a steady and ever-increasing interest among railroads in the adoption of this style of valve. The quiet yet efficient relief given by the muffler in contrast with the noisy open pop valve is appreciated and railroads are fast adopting muffler valves for the working valves on engines. In some states the law requires the use of them on all locomotives. It is claimed by the manufacturer, the Ashton Valve Company, of Boston and Chicago, that its patents cover the only practical method of regulating the pop without taking the valve apart or removing it from the locomotive.



Ashton Pop Safety Valve.

Reliability and low cost of maintenance are the claims made for the Lovell window operator. Over 75,000 feet of this device are used in railroad shops at Altoona, Collinwood, Scranton, Harmon and elsewhere. The rack and pinion with sliding rods permit easy action and a line of windows up to 500 feet can be operated from one point if desired. The power is equally distributed so that each window receives the proper push or pull necessary to open or close it tightly. The G. Drouve Company of Bridgeport, Conn., is exhibiting the device at the convention.

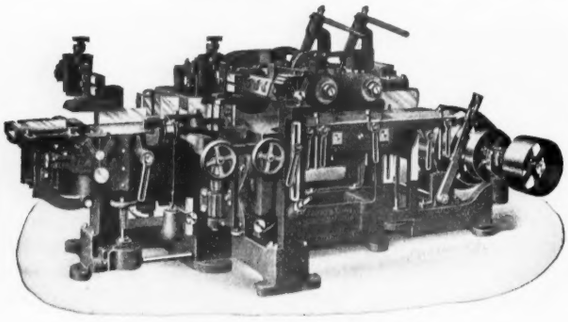
The United Traction Company of Albany has used Mason safety tread on some 300 car steps which is testimony of the efficiency of the tread.

FAY & EGAN 4-SIDE MOLDER.

The machine shown herewith is manufactured by the J. A. Fay & Egan Company, Nos. 155-175 W. Front street, Cincinnati, O., and is designed for extra heavy molding. It is made in two sizes to work material 12 inches and 14 inches wide.

The frame is a heavy cast iron structure, built up and mounted on a substantial sole plate made extra long to insure good belt service. The bed is raised and lowered by powerful screws mounted on ball bearings. It drops to the depth of 14 inches and may be securely locked at any position. The section of the bed aft of the lower head swings down out of the way to give access to the head. All adjustments of spring posts, side heads, etc., are made by hand wheels and locked to position with lever nuts.

The cutter heads are of crucible steel, 4-sided and slotted on each side. The upper head has an adjustable, detachable



Fay & Egan No. 184 4-Side Molder.

outside bearing with an upright column extending from the floor; the lower head has vertical and lateral adjustments.

Sectional clamp bearings are applied to both the upper and lower cutter head spindles. The bearings consist of metal plates held in position by clamp bolts, which exert no downward pressure on the journals, and which cannot be screwed tight enough to bind, as was often the case with the old style cap boxes. Any wear that may occur can be quickly taken up by releasing the clamp bolts and simply pressing the plates down with the hand. This is designed to always insure a cool running journal.

The chip breaker is adjustable and slides back out of the way; the pressure bars after the upper and over the lower head both swing up out of the way and the device is so arranged that without readjustment will return to its original position.

The side heads are mounted on the table and have independent vertical, lateral and angular adjustments, all made from the front of the machine. The outside head is fitted with the manufacturer's improved weighted matcher clip which, with the fence, is arranged to move simultaneously with the spindle and head.

The feed consists of four powerfully geared rolls; two upper ones are spur sections and two lower ones solid. The upper rolls are both driven down which permits the attachment of the company's patent spring hold down which gives an even pressure on the material and is in every way more powerful and satisfactory than the old system of weights and levers, usually found on a molder.

At the exhibit of the Hunt-Spiller Manufacturing Corporation are exhibited two cylinder packing rings which were recently removed from the cylinder of a modern heavy freight locomotive. These rings were removed when the engine was in the shop for general repairs and had been in service for nearly 16 months, and are still in good condition. The company submits that if the Hunt-Spiller gun iron is giving such service as this, it is no wonder that it is receiving the attention of the railroads.

CHARCOAL IRON FOR BOILER TUBES.

The Parkesburg Iron Company, Parkesburg, Pa., in summing up the advantages of charcoal iron for boiler tubes, states the following causes which contribute to its good qualities:

Iron has a much longer life when exposed to the oxidizing influence of either impure and pure water, because there is less electro-chemical action, by reason of the low percentage of impurities in iron.

Iron is free from pitting, because of its low manganese content.

Iron has good welding properties; these are rendered superior on account of the inherent amount of cinder in the iron and the low carbon.

Iron is fibrous and ductile, which qualities appear on testing through uniformly distributed elongation over the whole length of the test piece, rather than in elongation concentrated in one point, as shown in steel.

Iron is free from crystallization under vibration or shock, which is of great advantage in beading the end of the tube.

Iron has greater resistance to fatigue.

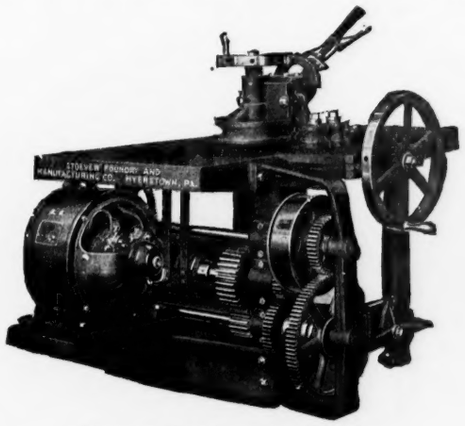
THE LENNOX ROTARY BEVEL SHEAR.

The Lennox rotary bevel shear is designed for the cutting of steel from ⅛ to 1 inch in thickness on a bevel. This is done by two circular blades made from the highest grade tool steel carefully turned and milled which rotate in opposite directions holding and feeding the plate at the same time they cut it. These blades are double edged so that in case of damage to one cutting edge they may be readily reversed. This machine is placed on the market by Joseph T. Ryerson & Son, Chicago, and is the result of over 65 years experience in equipping boiler shops. The makers have not only been able to eliminate the disadvantages possessed by other types of bevel shears now on the market but have incorporated in this machine many new features which have made it so popular that it is now in use in all the principal plate metal shops in America. An illustration of this is shown in the parallel arrangement of the shafts. This feature has the advantage of properly distributing the strains of cutting, while on the other hand it permits the use of small driving pinions of exactly the same size and which insures the rotation of the blades at precisely the same speed, and this in turn insures a clean even cut without damage to the material being cut or the blades. This arrangement of the shafts does away with the tendency shown in other machines to tear the plate and chip the blades and is largely responsible for the excellent work turned out by the Lennox machine. In fact the work turned out can hardly be detected from that having a planed edge. Another feature of this machine which commends itself to careful buyers, is the fact that the upper blade of the machine is fastened to the shaft by means of a flush fastening thus doing away with the ordinary fastening nut and permitting the beveling of such special work as equal leg angles of all sizes, etc. The Lennox rotary bevel shear will bevel any irregularly curved sheets. It will bevel in and out curves of a segment, angles and such difficult work as boiler heads after flanging, manhole saddles, dome sheets, etc. The cutting speed of the machine need only be limited by the ability of the workman to feed the work. The average work can be done in about one-tenth the time required to accomplish the same and by other means, while the clean, even finish of the machine bevel is far superior to hand work. For the general varying run of work of the ordinary boiler and tank shop, a cutting speed of not over ten feet per minute is recommended. The Lenox machine will bevel curved work as well as a straight class of work that cannot be done on a planer, and the average work can be done in less time than is required to clamp and adjust ordinary work in a planer. The machine is made in three sizes ranging in capacity from ½ to 1-inch plate and weigh-

ing from 4500 to 9500 pounds. Each machine is carefully tested before leaving the factory and is fully guaranteed against all defects in workmanship and material for one year from date of sale.

STOEVER PIPE BENDING MACHINES.

The bending of pipe in large quantities is always an interesting problem, and any machine which will successfully and quickly perform this work is therefore worthy of attention. The accompanying illustration shows a special ma-

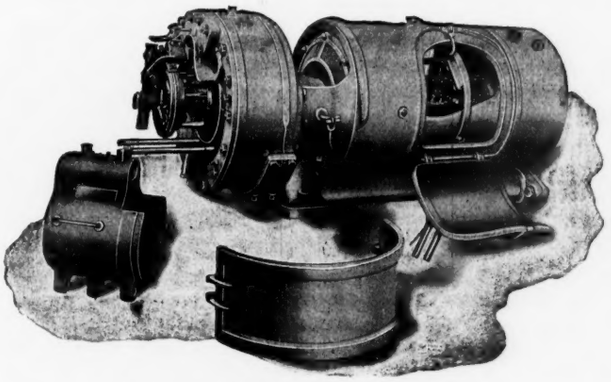


Stoever Pipe Bending Machine.

chine built by the Stoever Foundry & Manufacturing Company, Lebanon, Pa. It is made to bend pipe from one inch to two inches in size, and with a radius of bend varying from 2¼ inches as a minimum to 12 inches as a maximum. It can be driven either by electric motor or by belt power, the illustration showing both methods of drive. When using the machine, it is unnecessary to fill the pipe. It is placed in the machine in its normal condition, and the bend is perfectly made without distortion or kinks. In one shop where it is being used more than 300 bends made of 2-inch pipe to a 4-inch radius have been made in nine hours as a regular day's work. This machine has been placed in a number of railroad shops, where it is giving best of service.

PERFORMANCE OF CURTIS TURBINE TRAIN LIGHTING SETS OF LOCOMOTIVES.

For the past four years small direct current Curtis turbine generator sets of 15 to 25 kilowatts capacity have been used for train lighting service in connection with the so-called



Curtis Turbine Train Lighting Set.

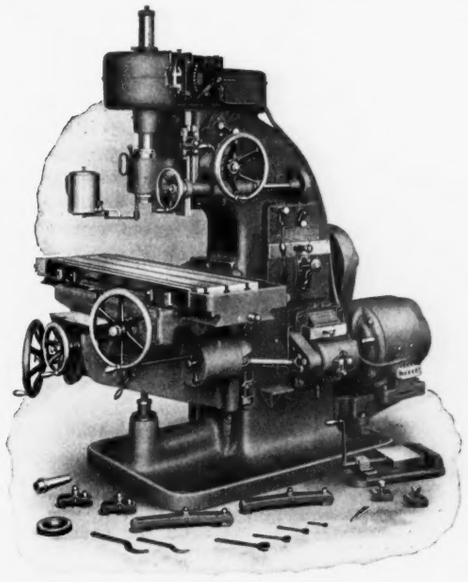
"Head-End System" in which a set on the locomotive or in the baggage car receiving steam from the locomotive supplies current for the lamps in the whole train. There are now over 60 of these sets in operation on about a dozen roads, and the operation has been so satisfactory that several of those roads have adopted them as standard for this service.

Up to the present most of these sets have been installed in the baggage car, and they are looked after usually by the baggagemen, as the extra work is very slight. It has, however, long been realized that the logical and more desirable location for the turbine set is on the locomotive itself where a continuous supply of high pressure steam, with good economy, is secured and there can be no interruptions from steam hose failures, which sometimes occur when the set is installed in the baggage car.

In order to obtain operating data on such an installation, the Pennsylvania Railroad has had one of these sets in daily service since the early part of 1905, and about six months ago put in service six more of these sets on locomotive hauling suburban trains. One of these sets is shown in the accompanying engraving, as it appears with the covers open for inspection.

INDEPENDENT FEEDS FOR MILLING MACHINES.

The satisfaction that a milling machine user will get out of a machine is proportional to the rate at which the work can be turned out, and the accuracy of the finished product, which is determined largely by the ability to obtain the proper feeds. Milling machine designers have for years been endeavoring to incorporate suitable feeds to meet the require-



Independent Feeds for Milling Machines—No. 3 Vertical Spindle Machine with Motor Drive.

ments of all diameters of cutters within the capacity of the machine. Both a fine feed per revolution of spindle for small mills and a coarse feed for large mills in the same machine have been objects sought. The Brown & Sharpe Manufacturing Company has submitted the constant speed drive as a solution of the problem.

In the constant speed drive milling machine, the feed mechanism is driven directly from the machine pulley shaft which runs at a constant speed and allows feeds to be obtained that are suitable for the most economical operation of cutters within the capacity of the machine. This point is illustrated by the following example:

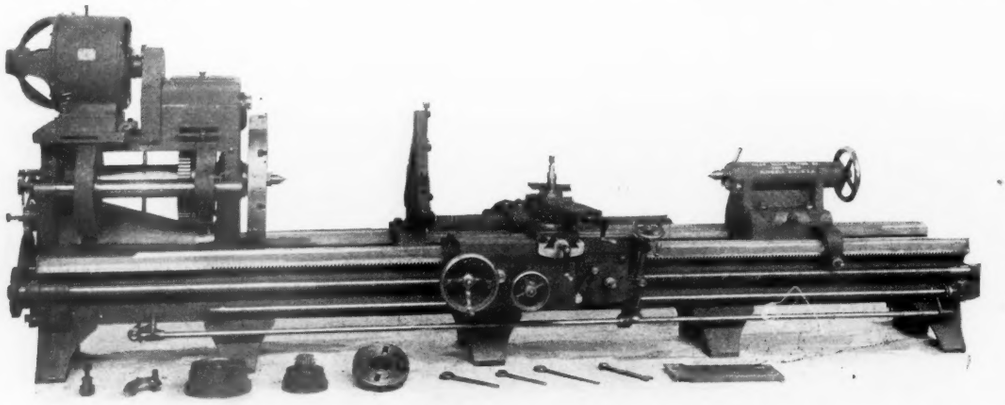
A cutter six inches in diameter with 20 teeth should run at just half the speed of a cutter three inches in diameter having 10 teeth; but the feed in inches per minute may be the same for both. If the feed is driven from the spindle, it

will need to be changed every time the spindle speed is altered, but if driven independently, no feed adjustment is required. As the feed is given in inches per minute, the operator is able to know at once the rate of production that can be obtained from the machine.

Actual work at the exhibit of the Brown & Sharpe Manufacturing Company illustrates this.

LINCOLN MOTOR FOR LATHE DRIVING.

The illustration herewith shows a Lincoln variable speed motor connected to an engine lathe with the controller handle and the starting and reversing rheostat separately operated from the carriage. The speed is changed without the use of a complicated electric controller, which the Lincoln company claims is one of the very good points of its motor, as when the speed is changed, it is purely a mechanical operation and there is no chance for electric controller troubles, all that is necessary with the Lincoln variable speed motor for starting and stopping is an ordinary starting rheostat such as used with any constant speed motor.



Lincoln Motor for Lathe Driving.

MICHIGAN LUBRICATORS.

The Michigan Lubricator Company is now manufacturing a 7-feed lubricator which is intended to supply oil to the following elements of compound locomotives: two high pressure cylinders, two low pressure cylinders, two steam cylinders for the compound air pump, and the air cylinder of the air pump.

This large lubricator is made on the same general plan as the other standard Michigan Bull's-eye sight feed lubricator and it is provided with the Michigan automatic drain valve. Mr. Bryan has new models at the company's exhibit this year for illustrating the principle of the automatic drain valve, and he reports larger sales and increasing favor for lubricators with this attachment.

The drain valve consists of a small, hollow copper ball float, working freely in a cage which projects into the oil reservoir. The float is so made that it rises and falls with the water level in the lubricator cup or reservoir, always remaining below the level of the oil, but at the surface of the water when the reservoir contains both oil and water as it usually does.

When about to fill this lubricator, the water level will be near the top and the remaining oil above the water. The ball float will be at the top of the cage. Upon opening the drain plug at the bottom the water level falls, and when below the top of the cage the ball float descends with it to the bottom of the reservoir. At this point the float seats and the oil is retained in the reservoir by the float, the water having been drained out. On filling the reservoir the float unseats itself when water accumulates, and rises with the water level to the top of the cage.

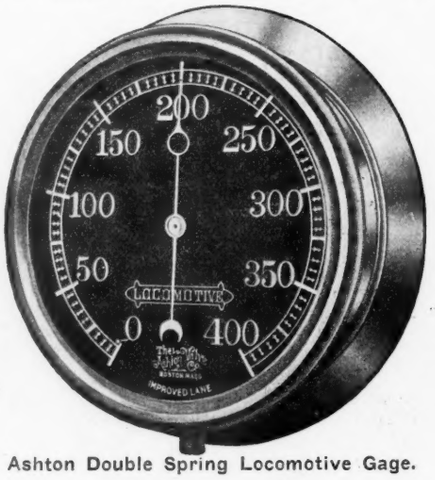
When the reservoir is to be cleaned or blown out with steam the ball float is unseated by screwing the drain plug nearly to its seat, when the pin projecting from the top raises the float sufficiently to permit the reservoir to be entirely emptied, after which the plug is screwed into its seat and the lubricator filled.

With this device it is impossible to waste good cylinder oil, and its economy is more noticeable, perhaps, where the drain from the lubricator is connected direct to a drain pipe, so that the discharge cannot be seen. In the latter case all oil remaining in the reservoir when about to fill it is lost, which, of course, occurs each time the lubricator is filled.

These valves can be made to fit any lubricator manufactured.

ASHTON DOUBLE SPRING LOCOMOTIVE GAGE.

The instrument here illustrated is designed to meet a demand for a locomotive steam gage that, by a simple dial adjustment, will always show the highest working pressure of the locomotive at the top of the dial, and the gage hand always in a vertical position at maximum pressure, same as shown in cut. The engineer knows at a glance what is the working pressure of the locomotive he is assigned to take charge of, and by simply noting the relative position of the gage hand, without regard to the dial graduations, can readily observe how close the pressure is being carried to the maximum. This gage is manufactured by the Ashton Valve Company of 271 Franklin street, Boston, and 174 Lake street, Chicago.



Ashton Double Spring Locomotive Gage.